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TABLE OF CONTENTS

Vol. VI **June, 1917** **No. 6**

Page

Vocational Sociology, *William Estabrook Chancellor* 223
Clay Modeling, Plaster Casting and Sculptural Finishing, *John R. Bell* 228
A Peace Pageant, *Lila Irene Lewis* 231
The Present Status of Mechanical Drawing and Its Future in the Schools, *Arthur B. Babbitt* 233
An Electric Motor for the Woodworking Shop, *Ernest B. Kent* 237
Veneering and Inlaying, *G. M. Nyman* 240
Short Unit Trade Courses in Iowa, *Kenneth G. Smith* 244
Is Industrial Education a Closed Door? *Cleo Murtland* 246
Editorial 248
The Lincoln Convention 250
Eighth Annual Convention of the Eastern Arts Association 252
Philadelphia Meeting of the National Vocational Guidance Association 253
The International Association of Teachers of Printing 254

Problems and Projects—

A Problem in Furniture Construction, *Victor Randel* 258
A Drum Sander, *R. L. James* 259
Bandage Winder for Red Cross Aid Work, *J. C. Park* 260

Now, Are There Any Questions? 261
News Notes XVI
Personal News XIX
New Books XXI

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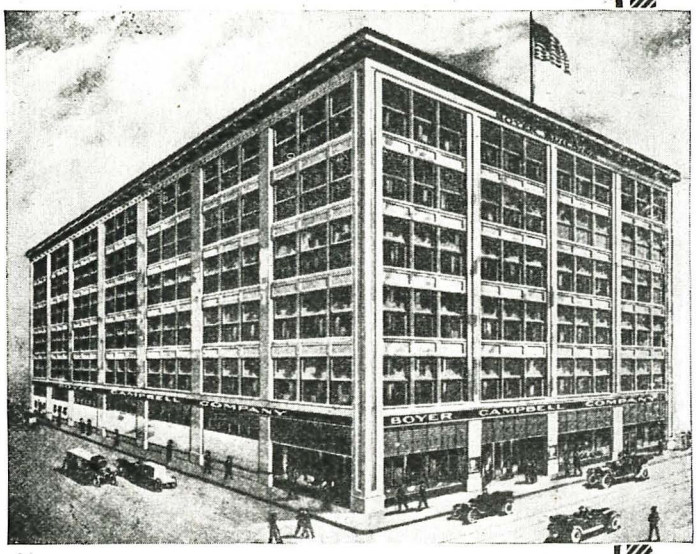

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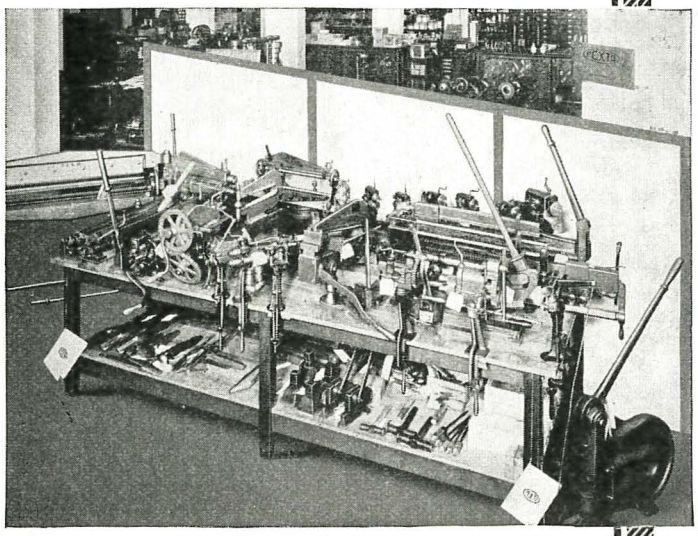

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INDUSTRIAL-ARTS MAGAZINE

Vol. VI JUNE, 1917 No. 6

VOCATIONAL SOCIOLOGY

William Estabrook Chancellor, Hoge Professor of Political Science, College of Wooster

IN recent years, we have heard much of vocational guidance and of vocational psychology. Departments and bureaus and even schools have been established upon the lines indicated by these terms. Many courses have been conducted to instruct teachers and other experts in these subjects. I myself have taught such courses in college summer schools. Nevertheless, most of us who have followed these lines have experienced considerable discouragement as to their values in practical life.

Vocational psychology means that different offices, trades and other economic interests require different powers and traits for success. This is scientifically demonstrable, and in an academic sense, it is highly interesting and even profitable to study. There is no limit of depth or breadth in human ability or character that one may not profitably reach for help in understanding the fitness or unfitness of men for their jobs, great or small.

We may study instinct, and discover that the instinct of vanity is a prodigious help in the success of a platform man because it makes him train himself day in and day out in manners, voice, dress, furniture of ideas so as to insure social favor from the first sentence to the last when he speaks, and that the same instinct may prove a fatal handicap to a family doctor.

Or we may study time rate in speech. Then we shall discover that a very rapid time rate of speech is a very great handicap to any man who must deal carefully with others less intelligent than himself but a means of economy of time to one who simply issues orders to subordinates in his power.

Or we may inquire into memory when we shall soon see that a verbatim memory is fine for a lawyer or preacher or teacher but it brings the peril of unconscious plagiarism to the author, of following words, not facts, to the scientist and mechanic, and of befogging the earth itself to the farmer.

Here is a man who moves with power and strength, while his neighbor moves gently, softly, slowly. The former is best fitted to be a longshoreman or a steel worker while the latter will prove in this respect admirably adapted for any kind of fine handwork from jewelry to human surgery.

All this is very interesting, and men will sit up nights to read books upon the subject, and they will go about daytimes gathering facts from observation of their fellows. We soon learn that a few traits appear with a regularity that at first astonishes one.

List of Instincts, Habits and Traits of Frequent Appearance.

Fear	Punctuality	Modesty
Vanity	Imitativeness	Reticence
Curiosity	Regularity	Conceit
Boldness	Loyalty	Truthfulness
Love	Honesty	Neatness
Hunger	Economy	Orderliness
Avarice	Generosity	Slovenliness
Sex	Foresight	Sensitiveness
Pleasing	Industry	Teasing
Ruling	Laziness	Joyousness

The list might be considerably extended, but brief as it is, these terms and their obvious opposites and similars include the instincts, habits and traits that in various permutations characterize and control 99 persons in the hundred.

Some such psychology as this is the foundation of vocational psychology, and vocational psychology is the beginning of vocational guidance as now practiced. The guide tries to find for the apprentice the economic line to which he is especially adapted. Therefore, he inquires in the community, in the neighborhood, and in the world generally where is the call for youth of this type and of that.

For one type, there is the muscular motor man, commonest of all Americans, derived from the Teutons, and seldom intellectually weak. Also, seldom is he of great intellectual ability. With him as the standard, it is easy to discriminate the others according to this simple grouping:

Temperaments.

Motor	*Sedentary*
Muscular	Anemic
Sinewy	Vital ("Corpulent")
Ideo- ("Nervous")	

Female only—Maternal (Half Vital—half Muscular)

Until a year or two ago, many of us who were working mainly, or partly, in this field, imagined that here were rich ores for the educators of America. It seemed that we were about to reorganize our schools, making the elementary prevocational, the secondary vocational, and the higher distinctly technical and special. The most completely educated of our product were to go to work in great enterprises with success assured from the start.

Nevertheless, the practical experiences of these recent years with the findings of science have conspired to raise grave doubts as to whether or not we have been working upon the right lines after all.

On their part, the business men of the country have been somewhat sceptical of all that we have done. It has not seemed to them of much importance whether a man came of the Black British breed of middle England and was domestic, vigorous, loyal and slow, or from the country at the mouth of the Rhine and was keen, patient, determined, roving and forceful· whether he had a large or a small field of ideas before expressing judgment; whether or not he had a body-weight co-efficient of 1.70 or of 2.90; whether or not he was moved mainly by the instinct of curiosity or by that of fear, or whether his greatest interest was in boats or in birds. What the business man is concerned with is nothing less or more than whether or not there is an economic demand for a certain item of goods or of services, and if so, whether or not the man can produce the goods or render the service. The point is that *a forty per cent efficient man doing something the economic world demands is of use while the hundred per cent efficient man doing something the economic world does not require is of no use.* Suppose a psychologist does prove that Miss A. has remarkable ability as a piano tuner, if the public is buying not pianos but phonographs, she will go to work as a saleswoman tho in that she is but 25 per cent proficient.

Just now coachmen and horse-handlers for private stables are dead in the market while the demand for chauffeurs and mechanics for automobiles is keen in every city of the land. The result is that some men who are experts in horse flesh are running big cars with danger to themselves and to all pedestrians.

The same is true of bookkeepers. Who cares now for an accurate adder of columns of figures? It is safer to trust the comptometer. Interest is now computed by tables. The practical arithmetician is lost in the modern business world. He seems to survive only in the statistical departments of universities and of governments.

Inevitably reflection leads us to the conclusion that our need is of a new point of view and of a new applied science. Instead of or in addition to psychological clinics and experts, we need the economist, the sociologist and the general social observer.

In my own circle, there was recently striking evidence of this. A girl of 22 years was graduated from a famous professional school of the East. She was large and strong and notably attractive. Circumstances required that she should begin her practical apprenticeship in the profession within a few hundred miles of her home. With ample means, she herself went to a dozen large cities within that radius, and corresponded with offices in smaller cities. The investigation showed that the geographic circle of her investigation had a population of six millions, and that precisely six women in all, young and old, were engaged in the profession, everyone of whom advised her not to attempt to proceed within this area. The reason is that the men are actively hostile to women in this field, and unless the woman has a real grip thru personal or family associations, a grip, not merely an influence, she will fail. The pressure of the male sex is utterly against the women. As a matter of commonsense in such circumstances, no effort in this field should for the present be made by any woman. That the fault was not due to personality is evidenced by the fact that she is now a high school principal.

The same principle holds in respect to certain trades. In this neighborhood, all ice cream saloons and nearly all small restaurants are in the hands of Greeks, and it is idle for any man or woman of any other race to try to compete with them. Somesthesia that gives one a fine sense of taste for foods and drinks, a true interest in the welfare of others however transient the meeting, and hygienic and chemical knowledge all indicate some men and women for these similar lines, but everywhere in this region the Greeks succeed and by their competition defeat all rivals.

There is a small neighborhood well known to me where all the plumbers, both employing and journeymen, are Irish; and in consequence this trade is contra-indicated for all persons of other races.

There are still larger matters for the educator to consider when he is thinking of the possible uses of vocational sociology. In the past few years, astonishing changes have taken place in the numbers of persons employed in the various gainful occupations and in their wages. Moreover, tho peace may come soon, and tho it will cause many more changes in economic life, the former things have passed away never to return. A new day is in this lurid dawn, and things will go differently.

The relative number of farmers has declined sharply, and machinery has taken the place of hands in the fields. Vast new enterprises are here to stay, conspicuous among them the automobile, the motion picture and the phonograph. The rubber industry with its many sidelines has been newly born. The collateral invention of a new sole for shoes is creating a vast new business. Prohibition is creating new lines and destroying many old ones. The chemistry of brewing is no longer important for youth to learn.

The marvelous recent development of trade unions, which are multiplying in numbers and vastly increasing in memberships, is stabilizing industry, and centering its varieties respectively in the various localities of the country. Even more influential has been the Federal reserve banking system, which is spreading manufacture and wholesaling into new regions. It will build great cities where were but villages before. Bank deposits convenient for credit operations are far more important than waterways in the determination of sites for business enterprises.

Some statistics may help at this point.

The 1910 census showed the following facts, viz:

Occupation	*Number engaged*
Lumber and timber	695,019
Foundries and machine shops	531,011
Cotton goods	378,880
Car shops	282,174
Printing and publishing	258,434
Iron and steel, steel works	240,076
Men's clothing	239,696

Such were the seven leading lines; no other had so many as 200,000 workers.

Now in the six years that have since intervened, lumber, cotton, and printing have all declined; men's clothing has barely held its own; while car shops, steel works and foundries have all increased greatly.

Turning next to several smaller fields, one notes that prices have greatly increased but actual production has fallen off in boots and shoes, in woolens, in brass, and in chemicals. In automobiles, there were employed in 1910, 75,721 persons. Now one manufacturer alone employs 35,000 persons, while the entire industry employs about 175,000 persons. And while prices have diminished, wages have greatly increased in the trade. Furniture has reduced its output and its employes, but increased wages and prices. Agricultural implements have raised prices and output and somewhat increased wages.

Every item in the entire list of 1,200 gainful occupations is worth considering. Even tho this general theme is well worth the planning of the educator for his students and graduates, there is a still closer examination possible, which has to do with the inevitable organization of the business enterprise. In it the much condemned empiricism is unavoidable. Men are tried in what are called the "lower" walks, and then upon success there they are "promoted" to higher duties. To the psychologist of the modern school, it appears that the man who succeeds in the lower walks does so because of peculiar aptitudes therefor, which very aptitudes are likely to handicap him in other lines. Lower down, one works with materials and with tools; higher up, one works with plans and with men. One range of duties calls for physical skill; the other range calls for constructive imagination and for social efficiency. Nevertheless, nine-tenths of the men who are foremen, superintendents and managers, and three-fourths of those who are directors and employers have come up by the long route, with its very different demands upon abilities and upon traits.

What is the explanation?

An illustration, tho striking and perhaps extreme, will clear the matter. An employing officer of a corporation operating street cars needs a motorman for a route thru city streets crowded with people. There are two candidates before him. One of these has fine eyesight, fine hearing, good memories by each of these tracts, quick muscles, great strength, youth and yet no human obligations other than decency and honesty. The other is somewhat, tho not too seriously deficient in eyesight, in hearing, in quickness and in strength, but he has an aged mother, a wife and several children, all of whom he loves devotedly. Any man would feel himself safer with the second of these candidates, any competent employing agent would take him first.

To say this is not to try to revive the old psychological phrase of "interest," for very likely the first man is more interested in railroading than the second. It raises to view the far deeper and more important human quality of motive, that of the inner life, that of the purpose and goal.

In any great business, the quality that counts for most is this of motive. What is the spring whence issues the work? Poor as may be his native equipment, the man in the lowest shop of the mill or factory who most cares to succeed will generally soon far outstrip the men with less serious motives and purposes.

This does not refer to such shallow desires as to have plenty of money for recreation, or to save enough for an automobile for one's family, or even to earn and save enough for a home and support in old age. Men who are strong-willed are seldom intellectual defectives, and they look further and deeper. Their aims are to acquire mastery of their industry, to establish a family for generations, being righteous and living righteously. Now these are matters that cannot be discovered by any psychologist or vocational guide; they are shut away even from the man himself in the earlier years of his life. They are indeed the development of his life-experiences. Often, the youth who is most conscious of them has them in but superficial and easily eradicated forms.

This brings us clearly to the value of sociological investigations to discover and to present economic opportunities. Assume that one discovers in his neighborhood a promising field for his own efforts. The promise awakens the inner life, and soon the worker finds himself engrossed by his enterprise and its duties. These make him almost a new man. One of the greatest botanists of our educational history had but one eye, and but one-tenth vision in that eye. And Edison, who has done more for the phonograph than all other inventors together, is so deaf that no human voice however loud can be heard by him until magnified by complicated instruments that reinforce and separate tones.

It is this inner motivation that explains why the obvious philosophical arrangement of the industrial world is practically valueless. That philosophical arrangement is something like this:

The Economic Hierarchy.

Bankers	Skilled mechanics
Capitalists	Other mechanics
Managers	Accountants
Lawyers	Clerks
Landlords	Hands
Salesmen	

If this arrangement had any real value, we should see but little going up and coming down the line but only transfers as of clerks from the steel works to the department stores, or of boot and shoe salesmen to drugs. On the contrary what we see is the brakeman becoming division manager and railroad president, and the reporter becoming managing owner.

Almost every man in control in American business either inherited it thru the institution of private property or began at the bottom, using there one set of abilities and in each grade as he rose another set. He drove himself up, no doubt here and there getting some unusual help but in truth generally because of some distinctive personal characteristic such as loyalty or courtesy. It is sheer theory to assume that in each stage he had very high natural abilities of the kind that it especially needed. The theory assumes that the man of great success in business is always an all-round genius. The facts are contra. Some great business men are almost stupid, but whoever saw one of them who was indifferent? Their powerful motivation is their invariable quality.

What America really needs as the product of its schools are men of three several types.

Men of the first kind will follow independent livelihoods. This was the ultimate goal of that great educator, Friedrich Froebel, who saw this as an essential feature of the economic life of every democracy. Such men will be their own employers. Often they will invent and produce new articles. They are the path-breakers for the future. They bear heavy burdens, and often they secure very large returns. It is evident that the contribution that the school makes to these persons is to strengthen their persistence, their courage, their ingenuity, their freedom, their judgment. Certainly, the school itself cannot discover these new fields. In truth, by its very nature, the school, which is traditional and conservative, renounces control and direction of all such persons, tho it does not renounce its training of their characters and morals. The renunciation is of intellectual discipline at least in some of its aspects. These youths who are to become men of independent minds and livelihoods are superior in this quality to their teachers.

Men of the second kind greatly to be desired in American economic life are such as do their work with uncommon zeal and skill. These also have independent livelihoods in that they live by social favor. They are the last to be discharged in hard times, and the first to be employed in good times. To an extent, these men and women can be developed in the schools. Their finer qualities of will and of ideals can be encouraged. Their hands, their senses, their fields of information can be developed. Moreover, the school can point out to these persons opportunities of future economic service.

When we read in the magazines that there are too many $600-a-year men and too few $60,000-a-year men, the great capitalists mean that they need in their enterprises men of this second kind.

We are short also of men of a third kind, of whom the school should produce many more than it does. Educators should know in general, and vocational guides should know in particular, where the real needs are, what lines are extending, what lines are improving, what concerns are prospering, and where the future calls. And then we should educate our youth so that they will be adaptable to the changing needs of the industrial world. This third kind consists of such as can do well several things not because they have learned any one of them well, and certainly not because they have learned all of them well, but because they have learned punctuality, faithfulness, concentration, the elements of science and of mechanics, and all the other good qualities that for many a year ordinary school teachers have been seeking for them often blindly but none the less earnestly.

Here are two boys, one already convinced in his heart that his main business in life is to be a good man like his father, and the other with good stuff in him, but no such purpose. The duty of the educator in the premises is evidently far greater and far deeper in the second case than in the first. Here is the point where a real vocational sociology will help. When the second lad comes to see that in some fields home-building and family-founding are virtually impossible, when he sees that he must choose between being a knockabout in the world and a "first citizen" somewhere, when he sees that one must take long views and seek distant goals if he is to be really useful, prosperous and happy, then he will ask the other and still more important question, whether his future line, if not permitting permanence, is still so important as to warrant the setting aside of these great human ambitions. Of course, no man can reasonably hope as a preacher or city school superintendent or actor or statesman to become permanent. He chooses to work in the plane of the higher ideals and to surrender a home for life and friends accordingly.

Vocational sociology then will serve several useful purposes. It will often prevent the preparation of youth for economic functions that will soon die out and leave them useless in the world of industry. It will point the way to personal success and to the best social service. It will stimulate talent and even genius to free endeavor. It will catalog the world as it is, and to an extent predict the future. It will reduce to quantitative measurement and to statistics the facts of the economic life that surrounds the school. It will warn the psychologist of things that it is not worth while to do.

It is very largely true that when the necessity arises in a human life, in most cases the powers requisite will develop. Therefore, the great educa-

tional need is to discover fair opportunities for endeavor.

In human psychology, traits are not so hard to discover. There are remarkable correlations. The men who are truthful are also in eighty-five per cent of the thousands of cases studied, courageous. Truthfulness is a function of courage, and courage itself arises from a deep sense of being truthful.

The men who are neat are almost always thoro and judicious. Also, they are usually vain, but it is a vanity often of a harmless kind in all its manifestations.

Good mathematicians write good English, and while the converse is not equally true, still those who construct their English compositions well are usually good reasoners in mathematics even tho deficient in computations.

The exceptions to the various correlations are of interest rather to the writer of fiction, to the theoretical moralist and to the pure psychologist than to the practical educator in the classroom. They are clinical cases.

The man who hears well will make a good office manager to receive reports and callers. The one who sees well has his indicated lines obvious to any experienced teacher.

There is no great body of difficult truth to be mastered in this field. The development of most children and youth is no puzzle limited to the strongest intellects of vast information. Tho of real value in education, the truth from the field of psychology is definite and of small amount.

Nor in any neighborhood are the economic opportunities obscure and difficult to discover. The field has its present intense interest rather because it seems new than because it is difficult and vast. Everywhere office work is office work. Selling automobiles is like selling anything else where the buyer comes into the market. Similarly, selling life insurance is essentially like selling in any other field where the seller must seek his market. Inventing takes the same moral qualities, whatever be the kind of invention required.

We are fully in the machine age, the age of trade unions, the age of specialists and of generalizers, the age of swift and in some instances unforeseen changes. Vocational sociology has but to inventory the details for any section of the country to make itself immediately useful to the local schools.

The commonsense of the parent asks not, first, whether the youth has such qualities in high degree or large measure but, first, what the openings are; then, second, whether he has the determination to succeed; and, third, whether he has enough of the requisite qualities to make a start. Enough means perhaps in a quantitative sense what teachers mean by fifty per cent. With this commonsense the school should proceed in its preparation of the youth for life.

In a practical world, we note that clothing is made almost everywhere to be sold almost anywhere, but canoes will not soon be manufactured in Nebraska, nor will straw hats be worn in San Francisco. For a thousand years, people will rest in Florida hotels in winter, and will play about the lakes of Maine and Michigan in summer. Business men govern their enterprises accordingly.

Some subjects we must always teach everywhere, but most others depend upon social and climatic or other distinctive characteristics of the vicinage.

Period Furniture

THE Editors of the Magazine are pleased to announce that arrangements have been made for the publication of an authoritative series of articles on *Period Furniture*. The authors will be Mr. Conrad Weiffenbach, Director of the Woodworking Department of the Technical High School of Buffalo, N. Y., and Mr. Anton Anderson of the same institution. Both men have had experience as commercial designers and as cabinet-makers. They are practical teachers and understand the possibilities and limitations of high and vocational school woodworking shops. They will present designs of historic and artistic value, together with complete working drawings, stock cutting bills, rods, types of construction, etc., in accord with modern factory and school practice. They keep in touch, constantly, with modern factories and their methods, so that the readers will receive this instruction at first hand.

All articles after the first, which will appear in the July and August issues, will be printed in lesson plan form, and in a manner that will easily be understood and easy to work from.

Drawings for these articles will be rendered by Mr. Anderson, who has had years of experience in this particular line in some of the factories of Grand Rapids, Mich.

Clay Modeling, Plaster Casting and Sculptural Finishing

John R. Bell, Instructor in Building Arts, State Reformatory, Huntington, Pa.

PLASTER casts are made from plaster or clay models, and the original plaster models are made from clay models, therefore clay modeling is closely related to the study of plaster casting.

For the novice a few tools will suffice but for professional work a complete set of tools is essential, as well as their proper application in performing the work. Plate 1 shows all the tools, with the exception of a bucket and brushes, necessary to model any class of work which I am describing. In pottery modeling revolving disks and patterns are usually employed. You will note in the plate referred to, there are three distinct classes of tools, wood, wire, and steel, which average about eight and one-half inches long.

The common name given to the double leaf, leaf and square, and trowel and square is spatula. These and the two wooden tools in the center and including the trowel and bead, are the most necessary and commonly used tools, which are almost as essential in plaster casting as in clay modeling.

In modeling vases, architectural ornament, bas-relief and sculpture, I have adopted drawing and mechanics in teaching this class of work, wherever it can be applied. In flat work, I have the pupil make a full-sized drawing of the object to be made, and after cutting out the drawing at the contour and rolling the clay to the desired thickness with a tool similar to the old fashioned rolling pin, I place the drawing on this flat clay and cut the clay away from the contour, giving a perfect fac-simile of the object to be modeled.

Having the drawing blocked out in squares, I have the same number and size of blocks marked out on the soft clay, and by the application of the block system I build up the models. In a short time the student will be able to make a model without the use of the blocks, and eventually without the contour drawing. In single form sculptural modeling, I accelerate the work by the application of front-and-side contour patterns of the object to be modeled. For instance, Plate 2 shows the double pattern of the bust of Shakespeare, which is illustrated to completion in Plate 4.

In Plate 3 we have the double-front contour pattern of the same bust. To use this pattern with accuracy, it is necessary to have braced upright posts of one by two-inch strips, with a ledger strip at the top and bottom for "running" the pattern. With the base of the pattern on the table and the side against the strips, the pattern is passed backward and forward. As the clay is banked against it the contour of the model is being formed. To hold the soft clay up while the work is progressing, the supports illustrated in Plates 2 and 3 are essential; these are made of any size strips available. The drawings tell their own story which makes further comments unnecessary.

In Plate 4, we have first in A the front-and-side clay contour of the Shakespeare bust, as it looks after the pattern work has been completed, after which the bust is modeled from either a standard cast, picture or an idea of how Shakespeare looked. In G we have the completed clay model, ready for the next step, which is making the shell.

To make the shell B and E, Plate 4, it is necessary to protect the model from the wet clay it must be covered with, prior to making the shell; if not protected the model and clay would become one homogeneous mass. The usual way is to shellac the model, which makes the clay coarse and rough after it has been worked over. To avoid this, I cover the model with a rag soaked in linseed oil, which protects the model.

After this covering, it is laid on the face or back on the table and clay is banked around the lower half of the model. This is followed by placing a sheet of clay about one-half inch thick over the upper half of the model, using the rolling pin for making the sheet of clay. After greasing this sheet of clay on upper half, we are ready for the calcined plaster, better known as plaster-of-Paris. A sufficient amount of water and plaster to complete the half is mixed in a pan or pail in a plastic consistency, which amount experience alone will determine. In mixing this, the plaster is poured in the water until it appears on the top, and is then stirred into a paste. The water should never be poured on the plaster.

This plastic plaster is poured and banked over the clay to the thickness of about one inch. After this sets or becomes hard, which requires about fifteen minutes, the clay is removed from the lower half and the whole mass is revers-

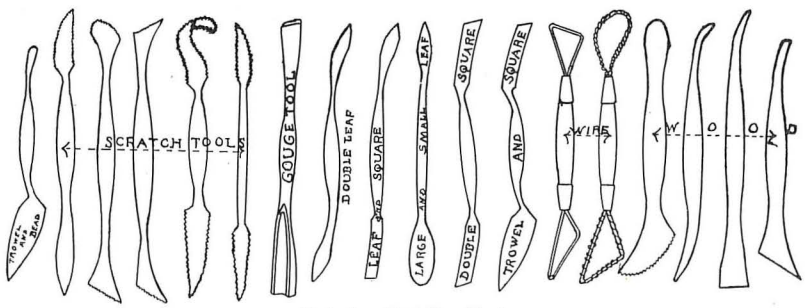


Plate 1. Modeling Tools.

ed with the finished half of the shell on the bottom. Keys are cut in the completed part of the shell to hold in place the other half to be made, as indicated on Plate 4. This edge which contains the keys and to which the other half is to join, is well greased with axle grease to prevent the two parts from adhering. The second half is made the same as the first. The time required for plaster-of-Paris to set depends on the age of the plaster and the temperature of the room where the work is being done.

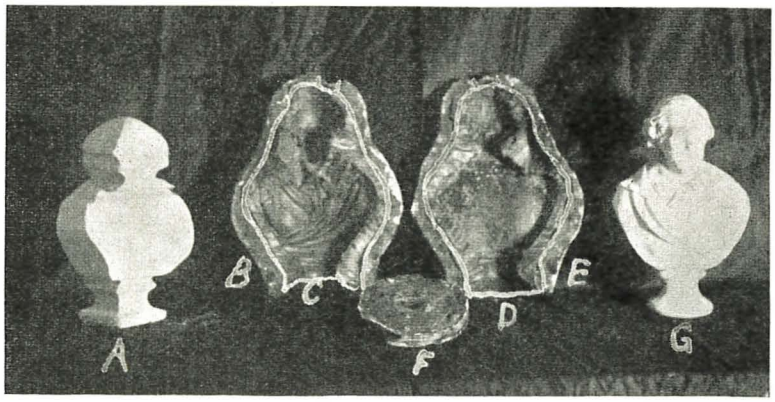
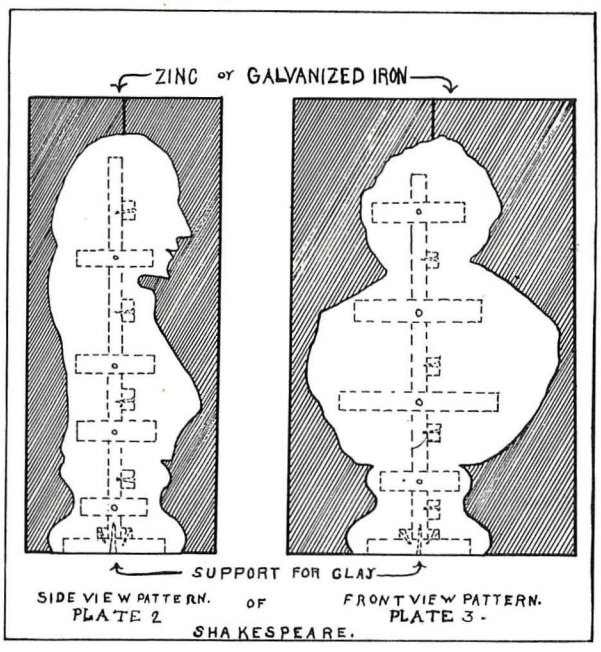


Plate 4. Molds and Cast of Bust.

Keys are cut in the bottom of the clay model and the edges of the completed two halves of the shell, which are greased with axle grease. The lid indicated in F, Plate 4, is made the same as the two parts of the matrix already described. Where the three parts are joined, the edges are trimmed with a sharp knife, removing the roughness. After sufficient time has elapsed for hardening, the three parts of the shell are separated with the double square spatula. The lid is first removed. After removing the clay from the shell and the model, where it was banked around the latter, the shell is washed, dried and shellaced and the inside and edges are greased with axle grease.

To cast from a model either clay or plaster, a wire staple must be put in the bottom of the model to hold the model secure to the lid, and prevent the model from touching the shell, and a hole must be either cut or cast in the center of the lid to hold the model secure to the lid. This hole is usually and correctly made by making a clay cylinder about two inches in diameter and the required height of the plaster lid, and placing this on the bottom of the model before casting. When the lid is removed the hole is completed. A similar hole is cast either in the top of the two halves of the shell or in the side of one of them. I prefer the former. In this hole the glue is poured which I will describe later. The model is made secure to the lid by the application of a noose. This noose is fastened to the staple and brought thru the hole in the lid, tied to a stick or chisel and twisted until the model is made tight to the lid. F, Plate 4, shows the hole in the lid.



Plates 2 and 3.

It is also essential that the two halves of the shell be reinforced. The usual way is to imbed wire in the plaster while being made. The other is to imbed canvas in the plaster, much the same as the doctor makes his casts. This I prefer, as it makes a stronger cast.

The shell being completed, the three parts and model are ready for assembling. The lid is first made secure to the model and the two parts of the shell to the lid. A string is wrapped around the three parts of the matrix, which holds them together. Plaster-of-Paris is plastered over the joints to keep the glue, which we will speak of later, from leaking from the shell when poured in at the insert at the top or side of the matrix. Fish or gelatine glue is used for this casting. The latter is the more commonly used and by far the more preferable.

The pattern work described in Plates 2 and 3, is what I call a mechanical invention to assist in executing real art.

Gelatine Glue Casting.

Much of the information given in this article represents years of accumulated knowledge gained by experience at this work, and from an Italian tradesman of renown.

The use of axle grease to prevent the various parts from adhering together is contrary to instructions usually given. Linseed oil is usually advised for this purpose. Oils are too thin for this work, as the heated plaster and gelatine cause the heaviest and thickest greases to melt. This light oil is absorbed in the plaster and clay almost like water. Axle grease being thick, heavy and cheap is most satisfactory for this purpose.

In the insert, at the top of the assembled matrix or shell, is poured melted fish or gelatine glue, the latter being preferable. The price of gelatine glue is about 22 cents per pound. This gelatine is put into a pail and moistened with water, and the bucket placed in a double-bottom glue pot, heated with steam. Two hours with steam will melt a bucket of glue, which would require ten or twelve hours on a stove.

After the gelatine mold cools in the shell, which requires four or five hours in a cool temperature, and ten or twelve in a temperature of 72 degrees, the string is removed and the shell parted as previously described. The gelatine is cut into two sections along the contour where the shell intersects.

The clay bust being previously greased with axle grease, is stripped from the mold as if it were rubber. C and D, in Plate 4, show the gelatine sections in the two parts of the shell.

The gelatine mold is dusted over the inside of the mold with French clay, known also as talc or talcum, or with Fuller's earth, to remove the grease which was applied to the model to prevent the glue from adhering to it. After the talc is removed with a brush, the gelatine mold is treated with a solution of saturated alum, applied with a brush, to harden the mold. After the alum becomes dry, the mold is greased with a solution of kerosene oil and spermaceti, of which candles are made. Only enough oil is added to the sperm to make it the consistency of lard.

This is superior to linseed oil in every particular. It is firm and colorless, will not be absorbed in the hot plaster, and will not color the casting. Linseed oil colors the casting, is absorbed in it, and will not satisfactorily prevent the mold from sticking to the casting. Linseed oil is responsible for thirty to forty per cent of the breakage where it is applied, while with the use of the two greases mentioned there is virtually no breakage at all caused by the parts adhering.

In making a cement cast, after the alum and before the sperm is applied, the gelatine should be varnished or shellaced with the best grade of either obtainable. This is essential as the cement deteriorates the glue, which is short lived at the best, before there must be a re-cast made in the insert of the matrix.

In making casts from plain models in bas-relief, pottery, etc., the model is greased with axle grease and the mold is made in one, two or three sections of plaster-of-Paris. This only applies to where there are no under cuts on the model to be cast from.

Plaster Casting.

After all the parts of the matrix including the gelatine mold have been assembled and made secure, the calcined plaster or plaster-of-Paris is sieved in a pail of clean water, converted in a plastic consistency and poured into the bottom of the mold. The lid is left off, as from now on it has no purpose to perform.

After the mold is turned upside down, it is revolved in the hands until the gelatine is covered with a thin veneer of plaster. The plaster is then poured out of the mold and the plaster in the mold allowed to set for several moments, after which the pouring in, reversing and pouring out is repeated for five or six times; or in other words, until the plaster in the mold is at least one-half inch thick, which thickness is determined by the size of the article being cast.

The bottom of the cast is next closed with the plaster that, by this time, has begun to set and is in the consistency of putty. This is leveled off with a knife, gauging trowel, or straightedge. When the plaster becomes warm, which requires about fifteen minutes, the shell is separated and the gelatine stripped from the new cast. The removal of the gelatine requires careful manipulation, and very often it is necessary to stop the stripping until the plaster from which the cast is made is more firmly set. There must not be too long a time elapse before it is removed, or the heated plaster, which very often becomes quite hot, will melt the gelatine and distort the mold.

If the latter happens, it is necessary to melt the glue and re-cast as previously described. It is essential that the required number of casts be made in one day, as the glue mold is short lived, and will in a few days' time shrink, warp and become hard, which makes imperfect and very often broken casts.

The modeling tools, illustrated in Plate 1, are brought into play in finishing the cast along the lines where the two gelatine sections of the matrix meet, and in filling in the holes of the cast caused by air bubbles in the plaster. This should be done before the cast becomes hard.

Mr. Shakespeare not being a common person must be garbed in suitable raiment. As bronze is most adaptable to busts, we will later on give him one of the bronze finishes.

Honor the man at the anvil. He may be mentioned in the trade catalogs only as "the skilled workman in our employ," but it is from him the fire must come if the cold metal is warmed into the vital life of art. —*Theodore C. Steel.*

A PEACE PAGEANT

Lila Irene Lewis, Supervisor of Art,
Belvidere, Illinois

MOST impressive and educational was the "Peace Pageant" enacted by the children of our Washington Grade School at Thanksgiving time.

It was thru the study and discussion in the upper grades of Current Events that the desire grew to express their thankfulness for living in a country that has been blessed with "Peace."

"What has fostered 'Peace?'" "What has brought about the high ideals and attainments of the American people?" was asked them. "Liberty, labor, education, religion" were some of the ready responses. The list soon grew which, with careful guidance and suggestions, was made into five groups. (See "Plan for Grouping.")

For the portrayal of these subjects—their costumes and symbolisms—it was necessary to refer to various books,* thereby acquainting the children with a new field of masterpieces and artists that otherwise might have been unfamiliar to them. The children and the grade teachers alike gained much in appreciation of mural paintings—their composition and symbolism.

Not by any means the smallest feature of the Pageant was a group of keen, alert young chaps so self-conscious that no power could induce them to appear before the foot-lights.

Were they to miss the joy and spirit of the occasion because they could not take an active part? Not in the least! They were the "Advertising Department" of the Pageant. They made posters announcing the event and placed them in windows of the local dealers.

Two productions of the Pageant were given in the afternoon at a local theatre which, by the way, was kindly donated for the occasion by the manager. A chorus of the grade boys and girls opened the entertainment, singing Kipling's Recessional." This was followed by the "Procession of Peace" down the aisles of the theatre singing a song of "Thanksgiving." On the stage behind the lowered curtain the children arranged themselves into their various poses. (See illustration.) When the curtain was raised only dim lights were thrown on the figures and the beauty of the arrangement and the harmony of color were beyond description. The full lights were then flashed on and the various ones spoke rare bits of literature suitable to the subject they represented.

*We found Blashfield's book on "Mural Decorations in America," likewise one by Pauline King, most helpful. Also suggestions given by Miss Lally, School of Education, Chicago University.

Description of Groups, Costumes and Symbols.

1. Center Group.

"Peace"—Gown, cream white cheese cloth, flowing sleeves. Carried Dove and Palm branch. Palm wreath on hair. (See sketch.)

"Justice"—Gown, cream white cheese cloth; shoulder drape of bunting of which only the blue and white shows from the front—excepting just a glimpse of the red as it flows from shoulder to floor. Carried scales.

"Liberty"—Gown, cream white. Shoulder cape of blue (to match blue in "Justice's" drape). The "Broken Chains" suggesting "Liberty."

"Brotherly Love"—Gown, cream white, with drapes of light blue and rose chiffon veils. Carried a rose.

2. Right-center Group.

"Plenty"—A well-rounded girl was chosen for this subject. Gown, earth-color cambric (made up on the wrong side for a dull texture). Bands of gilded cloth on costume and arms. Gilt crown and cornucopia containing brightly colored fruits and bits of greenery.

"Attendants to Plenty"—Gowns of yellow cheese cloth. Carried wooden trays (made by grade boys in Manual) filled with: (a) purple flowers, (b) fruits, (c) money-bags and coins (covered pasteboard), (d) vegetables. (See sketch for costume and tray.)

3. Extreme-right Group.

"Enlightenment"—Gown, earth-color cambric (reverse side), bands of gilt. Carried torch (made by rolling light-weight cardboard into desired form and fastening with gummed tape. See sketch for further construction).

"Law"—Robe of earth-color cambric. Stock of cream white cheese cloth. Carried sword and red book.

"Religion"—Gown, cream white. Outer robe, earth-color cambric. Head drape, cream white.

"Pedagogy"—Earth-color gown. Carried book. *Children*: Gowns, a light-blue and a rose cheese cloth.

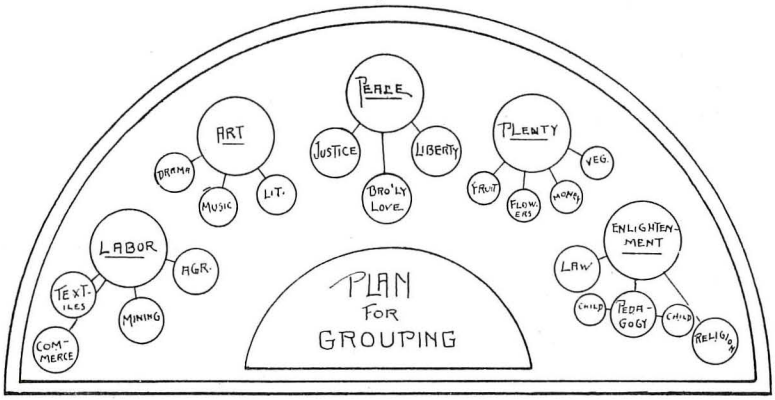
4. **Left-center Group.**

"Art"—Gown, earth-color. Carried palette (made in Manual) and brush.

"Drama" — Rose cheese cloth gown. Carried black mask.

"Music"—Light-blue cheese cloth gown. Carried harp (made by pupil).

"Literature"—Pale-green cheese cloth gown. Carried scroll (made by pupil).



5. **Extreme-left Group.**

"Labor"—Costume, earth-color. Carried pick.

"Textiles"—Earth-color gown. Multi-colored sash and headband. Carried distaff from which extended yarns of many colors.

"Commerce"—Earth-color costume. (See sketch.) Deep blue shoulder cape. Mercury wings on headband. Carried miniature ship.

"Mining"—Earth-color costume. Bands of mineral-blue binding legs, edging tunic and waist-line. Carried prospector's pan containing nuggests (gilded stones).

"Agriculture"—Earth-color gown. Wreath of wheat on hair. Carried sheaf of wheat.

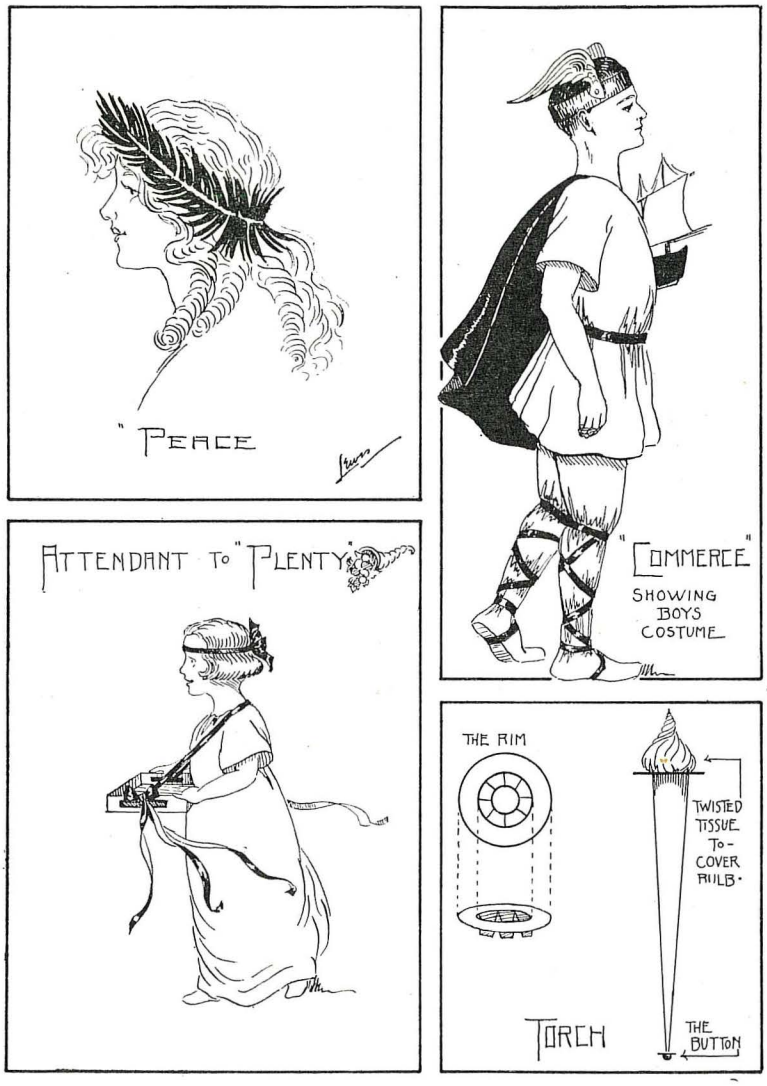
The "Earth-color" of the various costumes was beautiful combined with the colors.

The girls' gowns were cut from one kimono pattern and draped to suit the particular figure.

The boys' costumes were in two parts (see sketch of "Commerce"). The under-part was made from a "sleeping-out robe" pattern which you will observe overcame the difficult problem of "proper footwear" for the boys.

Many patrons and officials of the school complimented us on the production, saying that it was not only the most beautiful, but the *most educational* school affair that has ever been given in this locality.

The success of the Pageant was due to the excellent spirit which exists between pupils and faculty and likewise, to the untiring efforts and co-operation of principal and teachers.



SOME DETAILS OF THE COSTUMES.

THE PRESENT STATUS OF MECHANICAL DRAWING AND ITS FUTURE IN THE SCHOOLS *

Arthur B. Babbitt, Wentworth Institute, Boston, Mass.

DURING the last nine years in which I was employed designing machinery and tools, I had for an avocation the teaching of evening classes in mechanical drawing during the winter months. At that time, among both teachers and draftsmen, the discussion of the subject of mechanical drawing centered about two main topics: First, The color of inks to be used for the secondary lines of the drawing; Second, Whether the first or third angle of projection was better as a medium of expression. Some men advocated blue ink for center lines and red for dimension lines while others were equally insistent that just the reverse scheme was the only one to be employed. Some went so far as to introduce yellow and green—with no other purpose apparently than to revive discussion or to produce a new combination without a purpose. One color after another gradually disappeared until now only the red remains. That color is now slowly but surely capitulating, and at the present time the majority of our machine drafting rooms are using black ink for all lines of the drawing.

The discussion of the angle of projection to be employed was even sharper and more vigorous than that relating to the colored inks. Gatherings of teachers of mechanical drawing—the species had been propagated at that time altho it was not so plentiful as it is at present—spent hours in a discussion of this subject. The columns of the American Machinist were filled with red hot articles pro and con. All this helped to clear the atmosphere and in time the use of the third angle became almost universal. I know of no machine shop of prominence in the country which is not using the third angle, the General Electric Company being the last large firm to come over and adopt this principle.

The architect, however, still adheres tenaciously to the first angle. In his particular case, perhaps, it is less important as his plans and elevations are usually upon separate sheets and the relation of views is not so definitely shown. In details of construction, however, the relationship is manifest and the first angle is almost invariably employed. The architect also continues to use red ink for dimension and extension lines and for axes of symmetry, and will probably do so for some time to come. In fact, I personally feel that there is justification for the continuance of this usage, altho I can see no reason for the machine man using colored inks except in special cases. This shows that in the application of mechanical drawing practice varies and is dependent upon the subjects to which it is applied.

We are apt to consider the term "Mechanical Drawing" as applying particularly to the drawing of machines when, in fact, the term is much more comprehensive, dealing as it does with all drawings made with instrumental or mechanical aids, and applying to architectural, structural, and topographical drawing as well as to machine drawing. This variety of application demands varied instruction.

Summing up the physical characteristics of drawings as shown by common practice in our drafting offices we find that the machine draftsman is employing the third angle of projection, with a great majority of the shops using black ink for all lines; the architectural draftsman draws in the first angle and feels justified to continue the use of red ink, while in topographical drawing many colors are employed.

I have referred to these things for two reasons. First, to show that drafting conventions have changed and are continually changing; and second, to emphasize the fact that the requirements for the several trades vary considerably. These conditions demand that the teacher keep actively in touch with modern practice, and note and keep pace with changes in practice and conventions. The varying requirements demand that the boy be instructed along the lines he has selected for his vocation. This may seem difficult of accomplishment at first thought but when we consider that it is necessary, as I will attempt to show later, that shopwork accompany a course in drawing the question is not so serious. When we consider that the course in drawing should be definitely arranged for those who are taking trade courses, the problem is simpler and much more possible of solution.

Looking backwards again from the standpoint of the teacher and the course of study presented, we find that the course of study contained approximately the following:

A plate of lettering.
Use of instruments.
Geometrical problems.
Projection: two views given, to find the third.
Revolution of an object oblique to projecting planes.
Intersection and development of surfaces.
Study of spiral, helix and rolled curves.
Machine or architectural drawing.

Even tho this is looking back twenty years, how familiar it all sounds. How closely it resembles the course of study you and I studied, that you and I have taught, that you and I may perhaps be teaching

*Read before the Boston Manual Training Club, Boston, Mass., Feb. 10, 1917.

today. Because we were taught by this method and because we have taught this way is there any reason why we should continue? If this is the best practice, if there is no other method, then why discuss the present and attempt to anticipate a change in the future?

The teacher of mechanical drawing, particularly the high school teacher, has to cope with two entirely different conditions. In the first place, he has to meet the requirements of the colleges and technical schools; and secondly, he has to satisfy the demands of the shop drafting room.

Fortunate is the teacher who has his classes so divided that all the boys in each section demand the same preparation. These requirements vary considerably.

All colleges and technical schools place emphasis upon the applicant's ability to do good lettering in a rapid manner. This is also a primary requirement of the drafting room. The Massachusetts Institute of Technology say in their catalog that the applicant who desires to present mechanical drawing for entrance credit must be familiar with the projection of solids, and the finding of sections and developments. Experience in reading projection drawings is considered important and it is also desirable that the applicant shall have had some instruction in sketching from machine details.

Sheffield Scientific School at Yale in their catalog description of the preparation required for their examination make the following division: 1. Use of drawing instruments. 2. Geometric construction. 3. Orthographic projection. 4. Isometric projection. 5. Working drawings. The examination papers give greater emphasis to the subjects of orthographic and isometric projection than to the other divisions. In the isometric projection the student is required to show the planes of projection with the object in its proper relation to the planes and the projection lines and projections on the planes. Many times they require that this be drawn to the isometric scale.

The entrance examinations of the Stevens Institute of Technology are quite similar, with the same emphasis upon the projection drawing. The examinations given by the College Entrance Examination Board show the same tendency, with most of the questions relating to projection drawing.

The shops do not give examinations for entrance, but their examination after entrance is rather severe. In order to determine where the average teacher is failing to produce good, usable men in the drafting rooms, I have sent the following questions to the chief draftsmen in the leading machine shops of the country:

What do you consider the greatest failing of the young men entering your drafting room from the high schools, trade, and industrial schools?

First—With regard to their draftsmanship.

Second—Their interpretation of sketches and drawings.

Third—Their ability to rapidly and clearly give the required information on the drawing.

The following extracts from some of the letters received will show the nature of the replies:

"We find that students are almost always lacking in a realization of the fact that drawing is simply a means to an end, to express an idea, and that, as such, drawing should be made the medium to convey that idea in the clearest and simplest possible way."

"The lack of mechanical background makes their interpretation of sketches and drawings inaccurate, and requires much explanation in order to have matters made clear."

"One of the commonest faults is the failure to give a sufficient number of views or sections to properly describe the object."

The few extracts above are typical of the many letters received from different sections of the country. They come from Milwaukee, Cincinnati, Detroit, Cleveland, New York, Providence, Boston, and other industrial centers.

The teacher of drawing has in the past, and still is, preparing his pupil for entrance to college and technical schools with a great degree of success. This, however, is the smaller part of our work. Probably not more than five per cent of our entering classes go to a higher institution of learning. The remainder will go into business. Some will have a daily use for drafting; others will use it only occasionally. The majority of those in our manual training and trade courses should, if we are doing our work properly, go into industrial lines which demand a working knowledge of drafting and it is to the development of this larger percentage that we must give more of our attention in the future. The kind of drawing we must give these boys is the useful and usable type, the type which will enable them to clearly and rapidly interpret sketches, to quickly and accurately place the shop requirements upon the drawing, to carry thru changes and modifications of designs which are a very considerable portion of a draftsman's work.

Perhaps you will consider that I am giving too much attention to the industrial portion of the subject and too little to the cultural. My only reply to such a criticism would be that I consider a good, strong drawing course of machine or architectural parts which involves the relations of these parts to others, shop methods of manufacture, proper and clear presentation of the object with all data, properly given, will just as fully cultivate, develop, and strengthen the mental powers as a course of study in abstract projection of lines, planes, and solids, which have been twisted and revolved into impossible and improbable relations to the planes of projection.

By presenting this useful and usable drawing we will not only give the student a good preparation in a subject which will be helpful if not necessary in his life work, but from the very nature of it we also have the privilege of teaching an exceedingly cultural subject which will strengthen the power and habit of exact thinking—one of the most difficult of all habits to acquire—train the imagination, develop perception, enable one to think in three dimensions, and create a mental picture. Presented from the practical or applied standpoint we will also stimulate an interest in materials of construction, methods and processes of manufacture, and standard products.

I consider such a practical course just as educational and far more useful than one in abstract drawing. It involves something besides ability to draw lines, solve crooked problems and visualize an object. It demands a study of what the drawing is for, how the object is to be made, and how to get information to the workman.

Care must be taken in the development of such courses, for in the present day demand for the practical there is danger of losing sight of the educational. One of our shop criticisms was, "They know how to use the instruments, make lines, but lack knowledge of what they are drawing." In other words, we have made better hand draftsmen than head draftsmen. There will always be the necessity for teaching the hand part, that purely mechanical part of drawing which relates to the ability to letter, to draw lines carefully and accurately, to use the drawing instruments properly, and to work rapidly and neatly. These things may be accomplished whether the course is one in theoretical projection or one in practical working drawings. The head part, however, may be taught better by the latter and is the portion most often neglected.

There are two reasons for making a working drawing.

1. To describe the thing to be made.
2. To give data so that it may be made.

These sound so simple that many consider them hardly worthy of discussion. In fact it sounds so simple that we feel that a good, thoro course in projection or elementary descriptive geometry is all that is necessary to prepare for it.

To describe the object to be made—the first of the two reasons for making a drawing—demands visualization, judgment, and a knowledge of the processes of manufacture. It also requires an analysis of combinations of views to determine what is the clearest and simplest method by which information relating to the shape and form may be conveyed to the workman.

The architectural draftsman who can visualize the interior of a room as he is working on the plan has a valuable asset. If he knows how the fireplace, cornice, arch, porch, etc., are to be constructed the time of explanation in the office will be saved and the workman is more valuable.

There would be less botches in plumbing if more of our plumbers could make a sketch of the drainage and ventilating system before installation. If our electric wiremen could place themselves by imagination on the interior of a building by looking at the plans, and could know what cutting would be required for wires and conduit how much better results we would have. Suppose the mechanical man could see that by dropping off a lug here that the casting could be made in a two-part flask and without a loose piece in the pattern, instead of having the loose piece and being obliged to use a cheek mold. Would it save time and annoyance in the shop? If by changing a few dimensions on the casting, certain surfaces could be brought into the same plane and all milled from the same setting of the milling machine, time and an extra set of milling cutters could be saved, wouldn't it pay?

To give data so that it may be made—the second reason for making a drawing—requires a knowledge of the workman's needs both with regard to dimensions and shop notes, and what information of that sort is required. This demands a knowledge of shop processes and constructions. This brings us to one of the essentials of the subject under discussion. Unless we connect our courses in drawing in a vital manner with some correlated shop construction courses our drawing is going to be as dead as the Greek language.

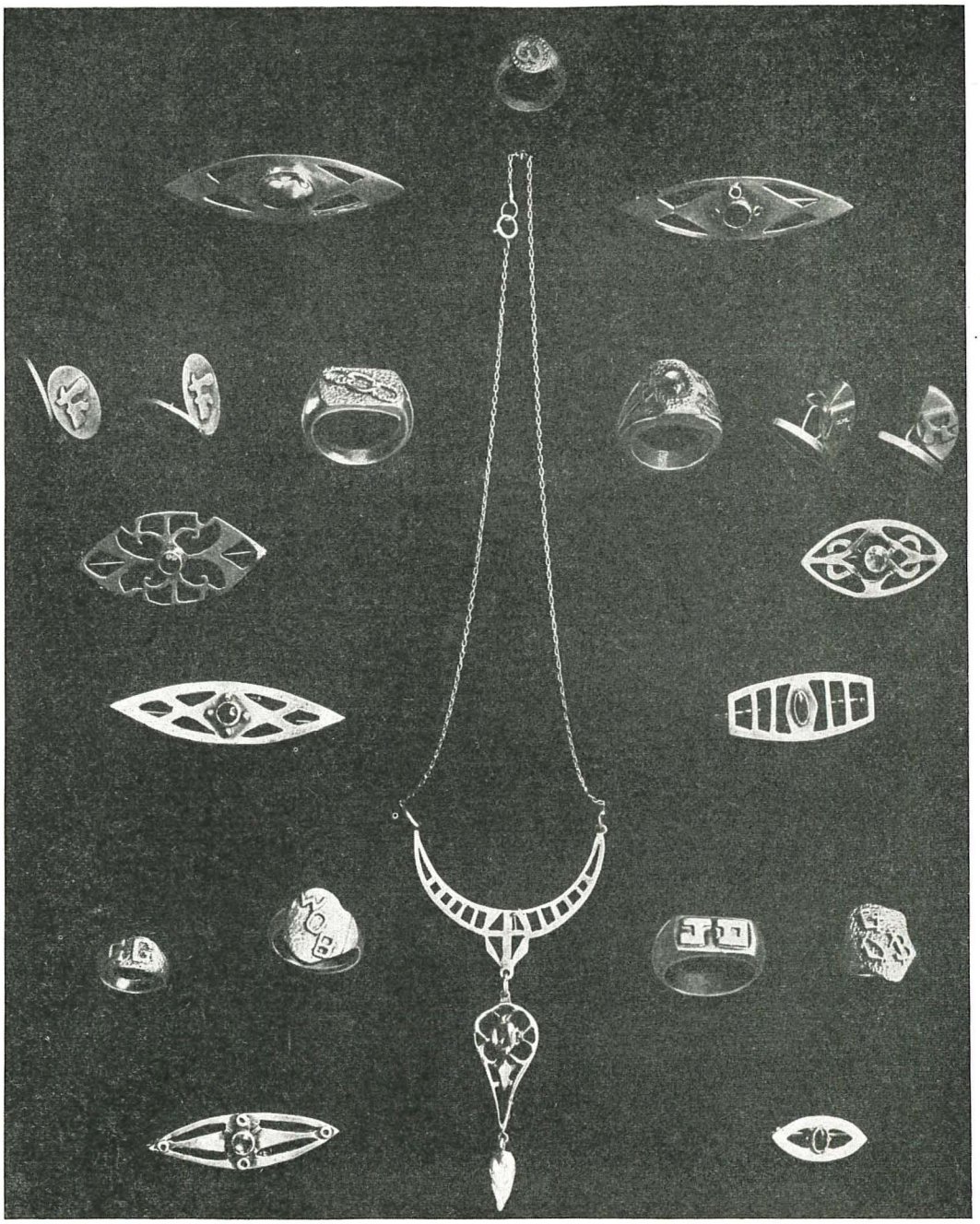
I firmly believe that our future courses in mechanical drawing will have to be more closely connected with construction courses and much more practical than they are today. The fundamental principles of relation of views must be firmly established, intersections must be worked out, mechanism in its several positions must be shown, and the use of sections should be thoroly understood. To do this, however, does not require an abstract course in projection before taking up the subject of working drawings. I know of young men working in drafting offices today who would look at you with a question if you should use the terms ground line, vertical trace of a plane, or the projection on the horizontal plane. They might think you were talking about an aeroplane. But say to them, "Here is what I want to accomplish," and hand them a few scratches on a piece of paper or give them a brief description and I guarantee they will give you a shop drawing which will produce the article. They know how to write the language and write in a clear manner.

Of course we make our drawings as artistic as possible, but the real test is whether, or not, the workman can produce the object from the drawing without difficulty. Give me the draftsman or the workman in the shop who can make a sketch from

which without question and without hesitation I can secure what I want.

I believe our courses in drawing need to be very elastic. There are certain fundamentals which have to be taught and certain processes which must be emphasized. These fundamental principles and processes are much more definite than the boys in our classes. One of the glaring faults of the past I believe to have been in making a course in drawing and then attempting to adapt the boys to the course. Let us try the reverse. Let us have our courses in drafting so adaptable and elastic that no matter what boy we may have, how little or how much previous training or natural ability he may have, we can suit the course and the problems to the particular needs of the individual.

This requires an enormous amount of material carefully arranged, a great variety of simple, medium and complex problems under each heading and a classification with steps so small as to meet the needs of the slowest pupil.



Jewelry designed and made by Students in the Art-Metal Classes, Springfield High School, Springfield, Ill. Mr. Arthur W. Peterson, Instructor.

An Electric Motor for the Woodworking Shop

Ernest B. Kent, Jersey City, N. J.

THE subject of Industrial Electricity will doubtless be given a place in any plan of manual training which aims to give the pupils some contact with a variety of fundamental industries.

In the case of shops equipped with a metal-working lathe our own plan has been to give a half year to the building of electric motors from rough castings, a project which furnishes an ideal combination of electrical experience and machineshop experience.

For shops not so equipped, the electric motor here described has been developed thru experiments covering several years. It has proven a very successful project, much more so, on the whole, than the telegraph key and sounder, the only other one which has seemed at all to meet these requirements. It teaches a more important application of electricity, it involves a more detailed study of electrical principles and being so much more *lively* when finished, it illustrates these principles more dramatically and arouses keener interest on the part of the pupils.

The materials, if somewhat irregular, are so easily obtained that it can be made under any limitation of shop equipment. In fact it has been used as a "desk-work project" for some classes.

As will be seen, the whole effort has been to shorten and to simplify. In some of our schools the classes have had but one year of shopwork, and five or six lessons seemed all that could be allowed for distinctively electrical work. The teacher who wishes, for any reason, to lengthen and to complicate, will find enough opportunities to do so. Among the possible embellishments may be mentioned:

(1) One piece horseshoe field magnet made of wire or venetian iron.

(2) The same with poles bent into arcs to conform to circumference of armature.

(3) Three-pole armature.

(4) Rocking brush-holder of wood or fibre.

(5) Reversing switch.

Except for (5) I think that these do not add much to the *electrical* value of the project, and that (4) really subtracts from this, in that it eliminates some of the highly educational "trouble" that would otherwise develop in operating the motor after it is finished. But it is often a good plan to permit specially capable pupils to attempt these as extras. This serves the double purpose of keeping the class together and of stimulating homework on the part of other pupils.

"Form A" takes only about three-fourths the time, care, and labor required for "Form B" tho the latter is much more realistic.

Description.

Field Magnet: Two vertical brads $2\frac{1}{2}''$ or $3''$, inserted in base as shown in drawing.

Armature: Two screws, preferably R. H. and about $\frac{7}{8}''$ No. 7 (or nails may be used) inserted in cork or piece of wood.

Magnet Wire: No. 24 or No. 23, either single or double insulated. A double layer of winding is sufficient, full length on the armature and about an inch long on the field magnets. With single covered wire place one layer of paper under each layer of wire. Direction of windings is shown in drawing. The ends of armature winding are tied with thread to the two sections of the commutator.

Bearings: Tin from a tomato can answers every purpose. The holes, when drilled, form a better bearing. If punched they may be smoothed by reaming with the tung of a file, or by taking the nail used to punch the hole and rolling it about in hole at an angle.

Brushes: Ends of field-magnet windings which cross the spindle. By hammering these wire-ends flat they are hardened and made more springy, tho this is not necessary.

Commutator: Insulate from spindle by winding on a strip of electric tape or gluing on a strip of paper, to give diameter of $3\text{-}16''$—$\frac{1}{4}''$. Then glue or tie two *equal* pieces of thin lead upon insulation. (Tin foil is not thick enough—the sheet lead from an empty tooth-paste tube is excellent.)

Battery: One fresh dry cell—or two or three old ones in series.

The processes themselves are very simple. If dictated in what I fear we must call the usual way, the result will be motors that run and pupils who don't know why, pleased tho they may be. To make them really understand a motor, even one as simple as this, is much more difficult, and more important.

In planning any difficult lesson many have found it a great advantage to separate the problem of "subject matter" from that of "method"—i. e., to decide first *what to teach* (and what to omit), and to consider afterward the question of *how to teach it.* This arrangement is followed below.

Lesson Plan.

Aim:

1. To enrich the pupil's ideas about electricity in modern life.

2. To acquaint him with the parts of simple motors and their functions.

3. To teach the principles of electro-magnetism and polarity as illustrated by this motor.

4. To furnish elementary experience in hunting electrical "trouble."

The making of a motor that will run is an *essential incident* in the accomplishment of these aims.

Aim: We don't want you to leave this shop without getting at least a little experience with electricity—because: (1) It is such an important

industry. (2) It is only by trying that you can find out whether you are fitted for electrical work.

Project: We are going to make a form of electric motor because it is the most important single piece of electrical machinery.

Value as Power Transmission. (*Railways, the Niagara plant, etc.*) Why so important?

This Motor. (*Its mechanical action.*) This is the one we are going to make very simple, but containing all the important parts. (Connect and run motor before the class.)

Types of Work. (*Woodwork, machine work, electrical work.*) What will be the main steps in making this?

The Base. (*Process.*) The base looks simple enough, but as you have already discovered this chamfer is not simple by a long way. A slip here spoils the appearance of a whole piece. What is the order of steps?

Electricity. (At beginning of second period.) We are not quite ready for the really electrical part of our work; we will begin now, so that all the discussion will not come at once and so that you can be studying it in advance. We don't know exactly what electricity is, but we have learned how it acts. What are some of the things that it does?

How it Travels. How does it travel to do this?

Compare with Light. Will it go thru anything? Just the opposite of light in respect to glass and iron.

Conductors. (*Copper, iron, other metals, and water.*) What are the best conductors? What others?

Non-conductors. (*Glass, rubber, silk, and cotton.*) What are the best conductors or insulators? What others? For next lesson be thinking about the question. *What makes electricity useful?* There are two important answers.

Now for today's practical work:

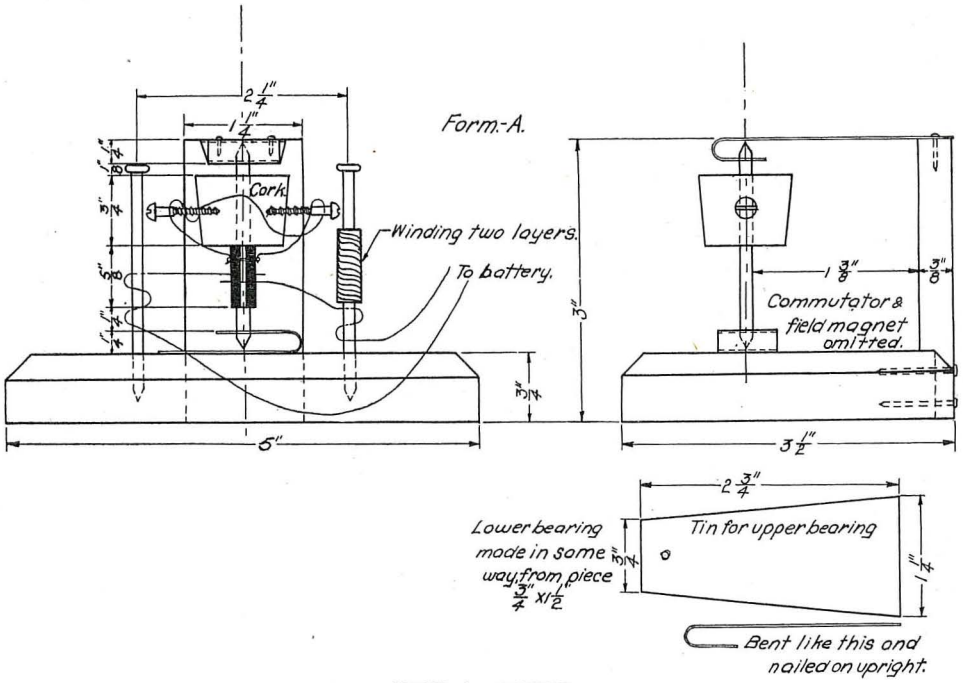
Machine Shop Work. Any electrical apparatus includes work of machinist as well as electrician—this one also.

The Mechanical Problem:

1. *Ends of spindle conical.*
2. *Field Magnets.* (*a. Parallel to spindle*; b. *Equidistant from spindle*; *c. In alignment with spindle.*) Notice the care necessary in all these problems of centering, balance and alignment. (Teacher explains, illustrating the points on the model motor, showing its points of similarity to the 99-cent motor which a pupil has kindly brought to class.)
3. *Cork bored centrally by the ends.*
4. *Armature Nails.* (*a. In line*; *b. Vertical to glass*; *c. Adjusted to just miss field magnets.* 1-32 *in. "air gap."*) Now if you are sure you understand these requirements go ahead—order of steps does not make much difference here, so take the tools as they come to you. In grinding ends of spindle use *side* of grindstone, not more than four boys at a time. (Demonstrate also the centering of cork from both sides and inserting of spindle and of screws or nails.) Of course the better the balance and adjustment of parts, the more easily and rapidly it will run. We shall test this when finished.

(When a few armatures have been finished.) Now all spin your armatures by hand when I give the signal. Each man call "time" as his stops. (Several trials—discuss failing of those that stop first.)

Industrial Electricity. (*Transmits heat and light.*) (At beginning of next lesson.) Today we want to see a little more clearly what makes electricity so useful—



TYPE A. MOTOR.

What are the two most important uses? (Have a pupil short circuit the battery. Class observes the spark and notes also how promptly the demonstrator drops the bit of wire.)

Transmits Power. But how does it transmit power?

A current passed round and round a piece of iron makes a magnet of it. Well I'll show you. This you see is just a common nail. I'll wind this bit of wire on it so, and connect it. Now what is it? Notice what happens now: (Break the circuit.) What does this experiment prove?

Application in: Electric bell, telegraph, telephone, electric motors, etc. This is the great means by which electricity is used to produce motion and all electrical machines are dependent on it. (Show pictures of electric ore-lifting magnets, etc. Explain telegraph very briefly and mention telephone.) Study electric bells this week and try to find out how the *continuous ring* is produced.

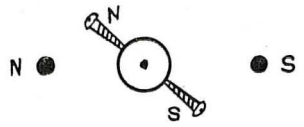
(When class is ready to wind coils.)

Now in electric motor—these two nails act as magnets. Does that explain the *circular* motion? Why not? To understand the circular motion we must go back and notice another very curious and useful fact about the behavior of magnets.

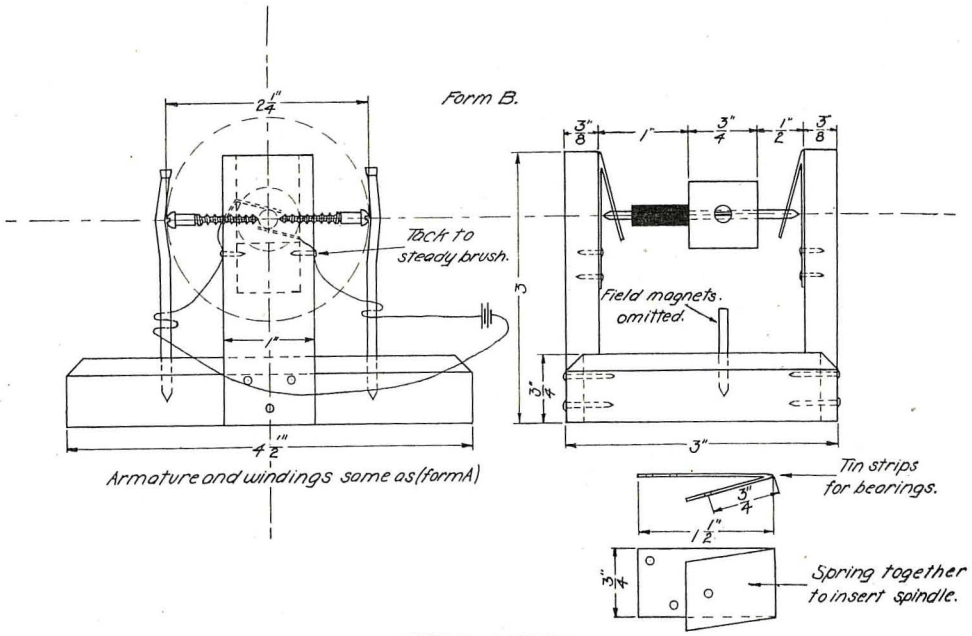
The compass is only a delicately suspended magnet. (A magnet does not always attract. Like poles repel. An electro-magnet acts in same way.) I will make a bar-magnet out of this strip of steel and suspend it by this thread—notice what happens. Now notice again. (Bring two north poles together.) I will now do the same with this nail or electro-magnet.

Reversing the current changes the poles. I will now reverse the connections of this magnet at my battery—watch carefully for any difference.

The motor employs two magnets: 1. *Field magnet;* 2. *Armature.* We are now prepared to understand all the motor. Notice these coils. They make two magnets in the motor—field *magnet* and *armature.* Suppose they are in this position: (Make sketch on board.)



Four distinct impulses in action. Which way will it turn? Yes. (*Insert arrows to indicate the four forces acting.*) How far will it turn? Why? Now to make it go any farther we have got to change the poles of one of the magnets. The way this is accomplished is the most interesting and ingenious thing about the motor.



TYPE B. MOTOR.

Armature has a single coil, ending in two separate pieces of tin foil on the glass tube—called commutator. Notice now just how this armature is built.

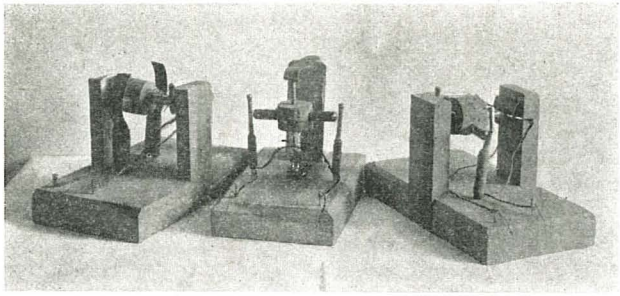
The brushes. Notice these *brushes* which carry the current from the field coils on into the armature.

Course of current. (1. *Battery;* 2. *Field coil;* 3. *Brush;* 4. *Armature segment;* 5. *Armature coil;* 6. *Second armature segment;* 7. *Second brush;* 8. *Second field coil;* 9. *Battery.*) How many can now trace the current from the battery, clear around and back to battery again? Try it.

How to Wire Motor. (Give explicit directions for winding of coils, cleaning ends of wire, connecting with commutator, etc.)

Tests. This motor seems complete; we will test it.

Circuit not complete. You see it doesn't even spark. What does that show? Yes, and remember



Motors made in Mr. Kent's classes.

there are six different places where the circuit may be broken. Look these thru carefully.

Spark proves a complete circuit. We will try another. (*It sparks but does not turn.*) To learn the trouble with this we must go back to our drawing on the board.

Proper "timing" of commutator. What would happen if the poles changed at the present position? Yes, it would go right back again. When then must the poles change? Yes, this is accomplished by turning the spindle inside the cork. Now look carefully at the position of your brushes. Then set your commutator so that the poles of armature will change at the right time and show to me. If it is right you may test with battery. No use to waste current until you are right on this. (This and various other final adjustments will involve considerable experience in "locating trouble" during which the pupils should be kept on their own resources in applying the knowledge already gained, and be given just as little direct assistance as possible. Pupils should be encouraged to bring in motors and other electrical appliances which they may have, and in this way motors with three or more poles in armature may be run and explained briefly before the class, comparing these, part by part, with the motors that are being built.)

VENEERING AND INLAYING

G. M. Nyman, Woodward High School, Cincinnati, O.

(Fourth Article)

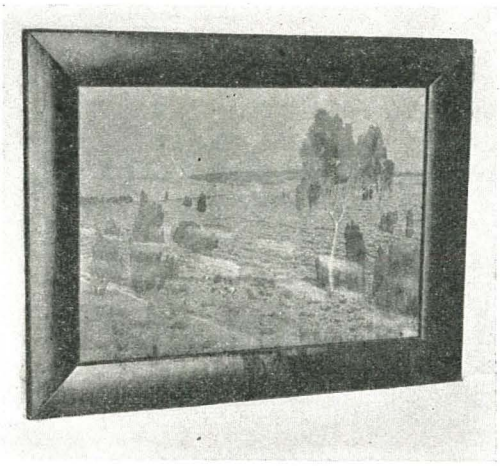
How to Make Concave and Convex Picture Mouldings.

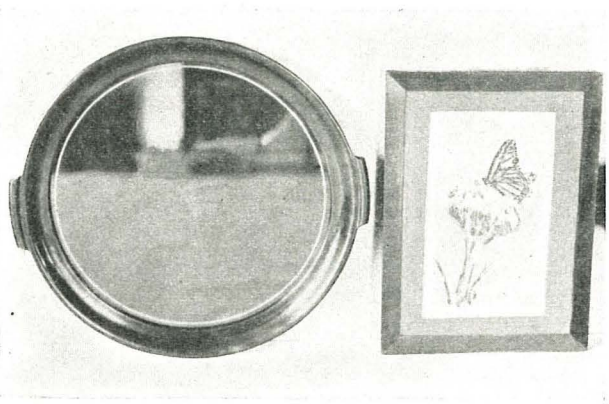
THE contracting pull of a one-side veneered surface is something that everyone doing this work and giving it some thought cannot help becoming familiar with. It is sometimes taken advantage of in making mouldings when a cove is desired. The process is as follows:

A thin strip—$\frac{1}{4}$″ of some soft, pliable wood—is veneered. The veneer previously has been expanded by the application of water. In drying the veneer will contract and in doing so will turn the core from a flat piece into a hollow cove. This, as previously mentioned, is nothing new, but to turn a flat picture moulding of good sized dimensions into a handsome convex curved one is a novelty that it was our good fortune to discover.

The moulding in question, intended to frame a 28″x40″ picture was 6″ wide, $1\frac{1}{4}$″ thick at outer edge, tapering to $\frac{5}{8}$″ at inner. A poplar plank 2″ thick was the stock used. This, with others, had recently arrived from the lumber yard and was dry, from the yard people's standpoint, which means dry enough to work but containing considerable moisture.

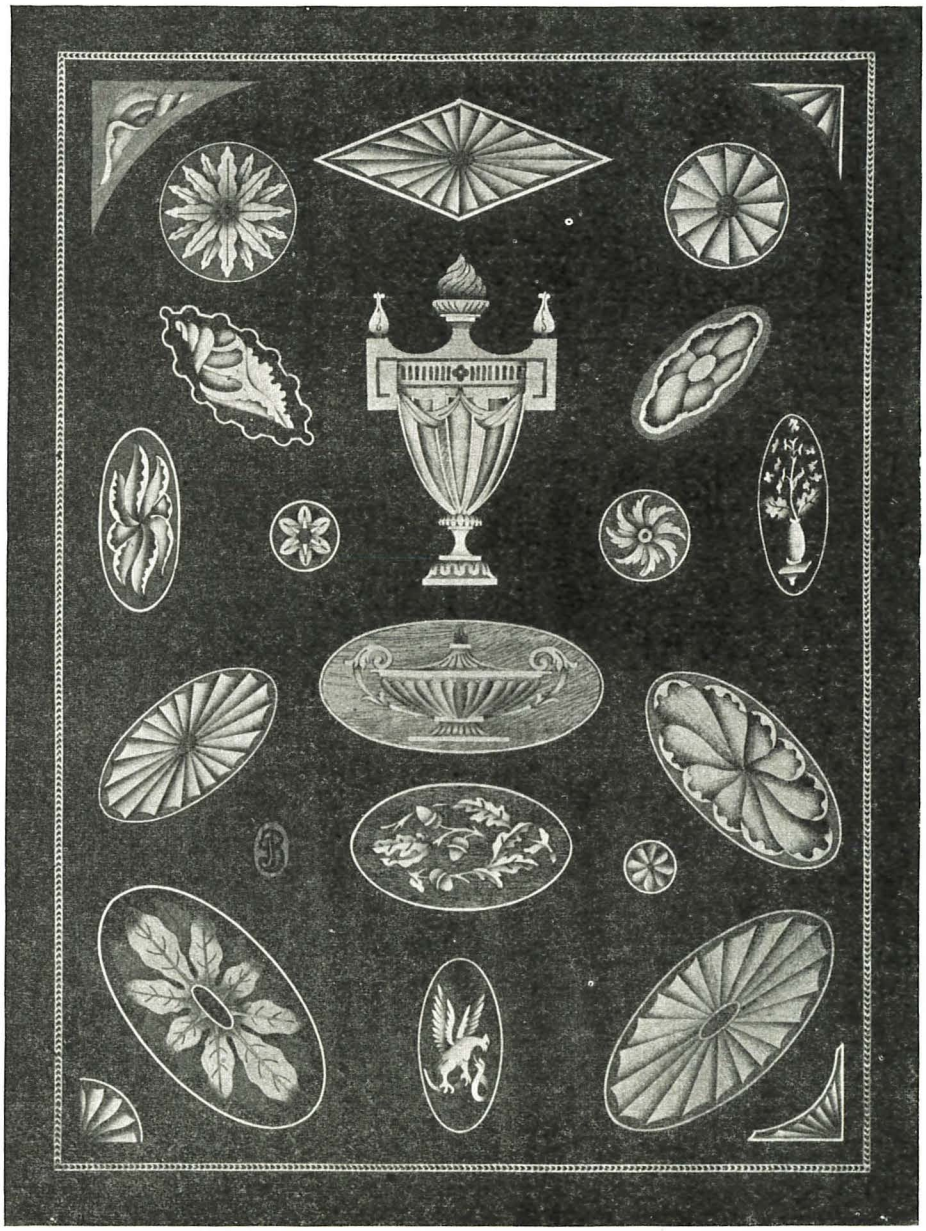
This plank was surfaced on four sides and then allowed to stand in the shop for a week while the veneer was prepared. As the steam heat was on, the surface of the plank dried in that time. It was then re-sawed at an angle, giving two mouldings of the desired shape. The re-sawed surfaces were planed and veneered on the sides that had been allowed to dry, with striped mahogany, the grain running at right angles to the core. The next day all hand screws were taken off, the surplus glue removed and





Picture Frame and Trays made in the Woodward High School, Cincinnati.

the two mouldings put away to dry, held by a C clamp in each end, veneered faces together and the re-sawed surfaces exposed to dry, with resultant shrinking and warping of those surfaces. In about a month, the mouldings had acquired their permanent shape, which on the face showed a pretty convex curve, being more pronounced at the thinner part of the tapered moulding.



Veneer Inlays. Courtesy J. Bernard Co., New York.

Inlaying of Lines and Borders.

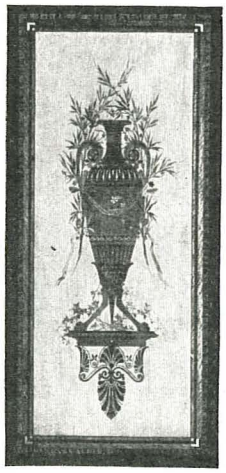
The inlaying of lines and borders on veneered work is comparatively easy. A tool, based on the principle of the double-pointed marking gauge, will do the work. The block should have a long face resting against the edge of object to be cut. This will insure a straight cut, if held firmly against the edge as it is moved along. The cutting points are the most important. They should be made to cut across the grain, as well as with the grain, and knife points will be found to do the best work. After the veneer is cut thru, the strip is easily removed. Especially is this true if the cuts are made before the face veneer is completely dry. In the latter case a narrow chisel can be inserted under the cut veneer and the strip will come out in its entire length and the line or border glued in its place—either pressed down or rubbed in place with a veneer hammer.

Small centerpieces, such as sunbursts, seashells and wreaths are sold inserted in squares or rectangular pieces of veneer. These can be trimmed to any desired shape, after which they are laid in position and scribed around; the background is then removed and the insert glued in place under pressure.

Furniture factories, using large quantities of lines—plain black and white—usually cut their own

Veneered Music Cabinet.

from logs of ebony and holly, using fine circular saws. Fancy borders of rare colored woods—natural and dyed—are purchased from manufacturers making a specialty of this kind of work. The borders come in yard lengths and retail for four cents a yard and up. The same manufacturers will also furnish lines from 1-16″ to $\frac{1}{4}$″ in black and white woods, natural or dyed, as well as celluloid, brass and copper lines. The most popular simple border consists of white lines between two darker ones or vice versa. This can readily be made by gluing three veneers, having



Veneered Marquetry Panel.

the desired colors, together and sawing it up in strips. In this way a number of more or less intricate designs in borders can be made up by those having the time, inclination and material. The latter can easily be purchased.

In order to lay metal lines, cut the grooves to fit closely, put shellac in groove and drive line in.

Marquetry.

The art of reproducing flowers, fruits and other forms of nature, as well as objects of human design, is called marquetry. The materials used are colored woods of varied kinds in their natural state or dyed, besides shells and thin metals.

The marquetry cutter must be a person of great skill and artistic ability in order to work out the pictures true to life in such unresponsive materials. The work is done by tracing the design on the veneer which is to form the background. The other veneers to form the design are glued onto the back of the former, with papers between. They are then cut with a marquetry cutter's saw—a machine resembling a foot-power scroll saw, adjusted with a tilting table or a tilting saw. This is to take care of the space left by the saw cutting its way thru the material. As very fine saw blades are used, it does not take much of a tilt to close kerf when design slips into place.

After being sawed the design is removed and shaded. This is done by dipping the piece in hot sand and scorching until the desired depth is obtained. Afterward the background and all pieces forming the design are assembled and glued onto a soft piece of cardboard and the marquetry is now ready for the market.

Veneered Marquetry Panel.

Amateurs can do a little experimental work along this line by embellishing objects with simple conventional designs. A fine scroll saw can be used; circular parts can be punched, or bored out with a Forstner bit. Lay all marquetry with paper side up. When dry after two days, remove papers by water soaking and scraping.

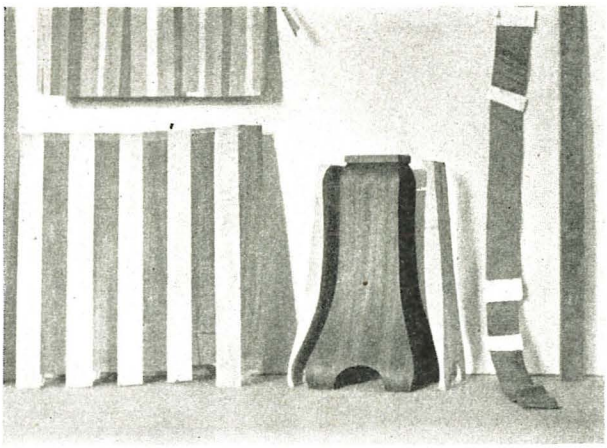
Marquetry work—borders and lines—rightly applied add distinction and beauty to any object. It sets off and gives life to surfaces that, without any embellishment, would appear flat and monotonous. As the work itself requires considerable skill in execution and application, the presence of it stamps the article as valuable.

Displaced and overloaded application of this kind of work will cheapen the appearance of any object, as will inharmonious and loud effects in coloring and outline.

Sand Box Method of Veneering.

This method was formerly used for work having complex curves, but is now obsolete.

To veneer by this process, fill with sand a box of proper size for the work to be done. Press piece into the sand until an impression is made. The sand is then slightly heated, after which glue and veneer



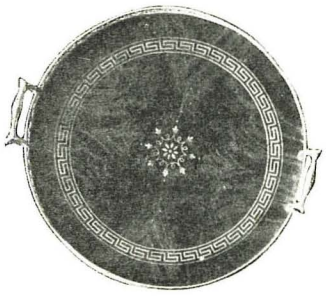
Inlayed Pieces made in the Woodward High School.

are applied and the whole pressed into the imprint, previously made in sand box, and clamped down.

Methods of Cutting Veneer.

A variation in thickness is often found in fancy veneers when they come from the manufacturers. In order to insure even pressure when laying, it is necessary to build up the thin veneers with paper or thin cardboard until uniformity is reached.

Face veneers for cabinet work in the market are cut from 28 to 30 sheets to an inch, the thicker grades to be preferred as they will allow for smoothing off. As many as 150 sheets to an inch are sliced from Spanish cedar. This thin stock is used for the veneering of cigar boxes.



Veneered Tray.

The slicing method of cutting veneers is perhaps the most common. The steamed square log is clamped in position, the knife comes down vertically and cuts off a slice with a shearing cut, after which the carriage moves the log in position for a new cut and so on until the entire log is disposed of, with the exception of that part held by steel dogs to the carriage.

Rotary cut veneer, so called when the round log is held between centers, revolves against the stationary knife and a continuous sheet is turned off. Another method is when the round log is cut in two and the halves, one at a time, revolve against the knife, producing a semi-circular cut on the round side of the halved log.

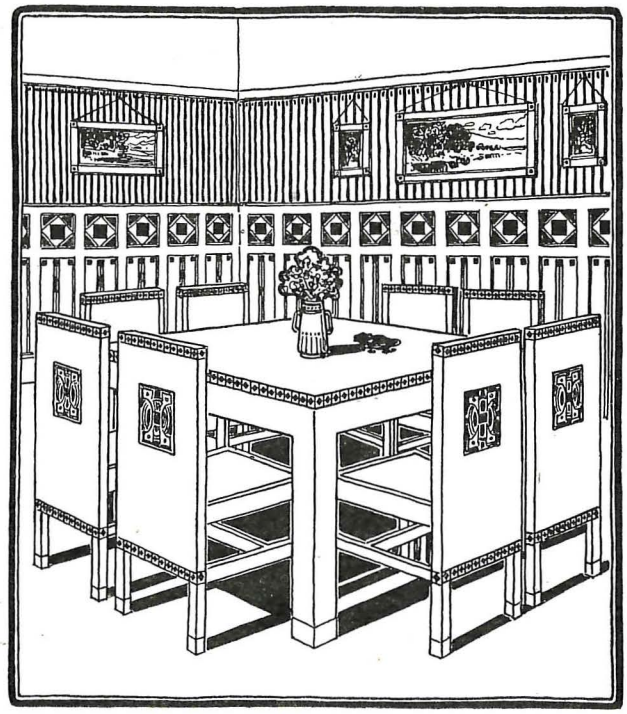
The above methods require boiling of the logs before cutting. This, however, is not done when the logs are sawed into veneers, as most of the thicker grades are.

Fancy root veneers are sometimes so undulated that they cannot be matched and joined, nor laid without first having been dampened down and pressed between hot wooden cauls. This will take out most of the kinks and make the veneer easy to work.

Specially constructed circular saws of large diameter are used in veneer sawing. These saws waste very little lumber in cutting. They are made with a large iron disk, which is quite thick at the center; the cutting rim is fastened to this in sections with machine screws. The rim, itself, is hollow ground to 1-32″ at the cutting point—1-32″ therefore represents the amount of waste for each cut. It is evident that the saw must be perpendicular on the side towards the log; the increasing thickness from teeth to arbor all occurs on the outside. As many as twenty sheets to an inch are cut by this method.

Veneering has made it possible for us to enjoy beautiful furniture; it has a place of its own and needs no apology for its existence.

People are beginning to realize that veneered articles do not necessarily mean cheap articles. In fact, a built-up panel will, in most cases, cost more than the solid one. Matched panels of fancy figure would be entirely out of the question in solid wood; the changing structure of the log for each succeeding cut would forbid that, even if it were possible to build furniture of wood with the grain running in all directions.



Veneered Marquetry. Courtesy J. Bernard Co., New York.

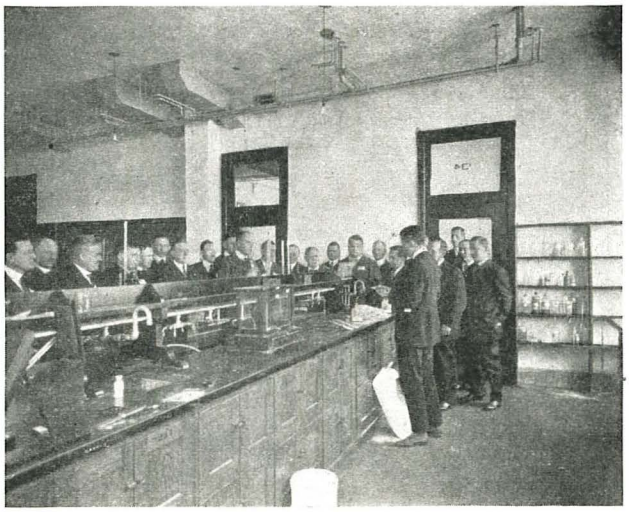
SHORT UNIT TRADE COURSES IN IOWA

Kenneth G. Smith, Iowa State College

THE Short Unit Trade Course is by no means a solution for the problem of industrial education, but as a starter and rouser of ambition and enthusiasm for further education it is most effective. Due, perhaps, to the influence of the well known and established Agricultural Short Courses, Secy. J. W. Parry, of the Engineering Extension Department, of Iowa State College, has developed several short courses for men and women engaged in the trades which are given regularly each year at different points in the state, their location depending chiefly on the support of the local tradesmen. The instructors are specially engaged master craftsmen and for the time being, are members of the Extension Faculty. The duration of these courses is from three days to two weeks and every minute of the time, except an hour or two of demonstration, is devoted to actual manual work. Evening sessions are devoted to discussions of papers and technical points of interest.

A Trade Short Course and a course of lectures are two entirely different things and resemble each other as a brick pile resembles a house. Lectures are lectures, sometimes soothing and soporific, sometimes instructive. In any case, the teacher does most of the work. A trade short course involves demonstrations, classwork and a large amount of manual work on the part of the students. It is highly specialized and conducted by an expert who has a definite aim and who bends all his energy and that of his students toward attaining it. It is not an educational tonic, but a dose of highly concentrated medicine to be given by a competent physician.

The first and one of the most successful trade short courses in Iowa is the one given for painters and decorators. In this course, one week is devoted to graining and one week to stenciling and wall work. The work in graining is done by individual students on panels and doors, and the work in stenciling on panels or sometimes on the walls of local buildings if they can be secured. During the current year this course has been given in six different towns: Des Moines, Dubuque, Davenport, Council Bluffs, Ft. Dodge and Ames. Scattered over a wide geographic area these courses are available to practically every painter in the state. In Des Moines the public schools and prevocational school rendered assistance, and advanced students and teachers of manual training attended demonstrations in wood finishing. Beginners are not admitted to regular classwork, because the instruction given for journeymen is not designed to meet their needs.



Color comparisons of flour at the Bakers' Short Course. So many bakers registered that the carefully planned individual laboratory tests had to be discarded and demonstrations substituted.

Another short course given is for telephone operators. This lasts three days only and was given last year in sixteen towns. The instructor, an expert operator, carries with her complete equipment for calling, recording and making connections for local and long distance work. Operators situated in the same or adjoining rooms put thru messages and recorded them exactly as if operating on a switchboard. Standard forms adopted by telephone companies for calling, receiving and recording were employed and the girls were taught to use them. The result of this course has been the standardization of telephone operating among the independent companies of the state and naturally much more efficient work on the part of the operators themselves.

Of a somewhat different character is the course for janitor-engineers of school and other public buildings. In this course, five evening-class sessions are held and the instructor during the day, visits each man at his own plant, giving individual help and instruction on firing, ventilation and plant operation. A small textbook is furnished the student and on this and daily experience, the evening-class work is based. Those who desire may, when the classwork is finished, do more thoro work by correspondence. An examination is given on completion of the correspondence work and a certificate is issued to those who pass the test successfully. Manual skill plays a smaller part in this course than in the others mentioned and for this reason, it is well adapted to correspondence study.

The most recent development is a course for master bakers, conducted at Ames. The work is quite advanced and technical. Laboratory practice included:

Gluten determinations.
Sponge and baking tests.

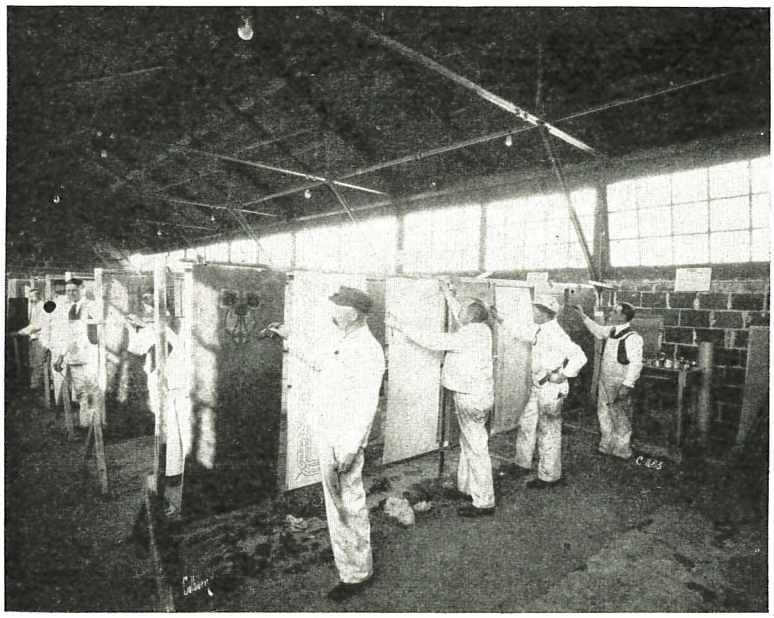
Color tests.
Dough tests.
Pekar tests.
Gasoline color value.
Flour bleaching.

Dough was prepared with various flour improvers such as:

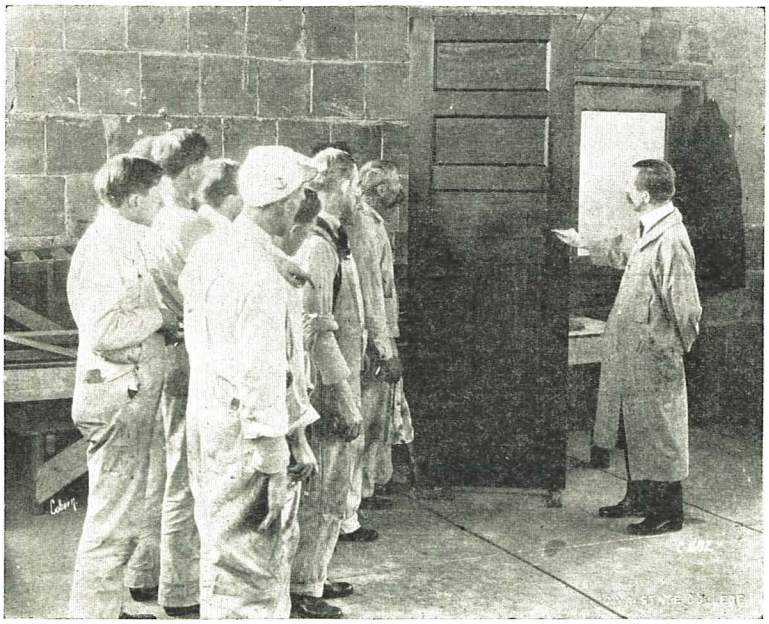
Calcium sulphate.
Phosphoric acid.
Potassium bromate.
Potassium persulfate.
Pasteur's salts.
Ammonium chloride.
Ammonium carbonate.
Ammonium tartrate.
Ammonium phosphate.
Calcium acid phosphate.
Also fresh malt extract and bran extract.

Sixty-three master bakers of the state registered, over three times as many as were expected.

Naturally such courses as these are of benefit only to persons already engaged in the trade or occupation represented, not to those who desire to enter the trade as beginners. They increase in a marked degree, the efficiency of the worker and insure his support for the education of the beginner. Until the journeyman and employer realize the benefits of specialized trade education, they are going to demand but little in the way of training from their apprentices and employes.



A PORTION OF THE PAINT SHOP.



GETTING FINE POINTS ON MAHOGANY GRAINING.

IS INDUSTRIAL EDUCATION A CLOSED DOOR?

Cleo Murtland

A MEASURE of fallacy and a measure of truth appear in an article entitled "The Limitations and Possibilities of Industrial Training for Women" which appeared in the March number of *Industrial-Arts Magazine*. "Nowhere, we believe," says Miss Bryner, "has anyone come out directly with the statement of the fact that the problem of training girls for industrial life is bounded with what can be done with the needle and needle machinery." For verification of this statement, the author cites the preponderance of attention given to the sewing trades in school surveys, in investigations in occupational analyses, and in vocational conferences.

One wonders if the author has intentionally construed much discussion and many investigations and analyses of the sewing industries to be an acknowledgment of paucity of opportunity in other fields of industrial work not yet so thoroly and comprehensively studied.

The need and the value of concentrating attention upon a subject of almost universal interest during the propaganda period of the development of industrial education have not been noted in the discussion. Failure to consider in this connection the tremendous force of social prejudice with which industrial education has had to cope is an oversight not expected of the social worker. It has taken much careful argument to convince doubting educators that sewing in its various phases has an educational content. This is particularly true of the sewing done by means of the electric power machines which represents an increasingly large proportion of the industry. Like other subjects not belonging to the traditional list, sewing has not gained its place in the curriculum without unflagging effort on the part of those who believed in its educational worth. Only within recent years has it been recognized that "In every sewing trade there is an educational content which demands an appreciable amount of training." It has not existed as a formulated subject from the outset and remained in storage until such time as it could be put into use. On the contrary, acquaintance with the content of these trades has been gained thru painstaking study covering a long period of years.

Contrasted with the sewing industries, the author has enumerated other industries which, because they are not "homogeneous" have been relegated to the educational junk heap. "Semi-skilled operations form a superficially homogeneous group." "They have in common neither tools, nor materials, nor products." "Either they require no tools or else they use automatic or semi-automatic machinery." "The operations they perform require but a short period of time to learn." Does homogeneity, in the author's opinion, constitute the essential element in determining educational content in industrial work? In this, the author reflects the attitude of the unprogressive educator by an implied under-rating of the isolated job, and acknowledgment of the value of others only when some common elements have been found which bind them together into one group. Failing to find similar relationships among other industries, the assumption is that content does not exist. Bulk seems to be the convincing element in favor of education.

Analyses of industrial occupations other than the sewing industries are too few to warrant conclusions of any sort with regard to educational content. Would Miss Bryner have made a similar statement about the sewing industries if the mass of published investigation had not taught her to take a more discriminating point of view?

By what standards is the educational worth of any type of work determined? At present, they are little more than the amount of old-fashioned arithmetic needed, the extent to which blueprints and specifications may be used, the amount of scientific knowledge that may be applied, and other similar standards of a past school generation, none of which have been brought up to date in an accepted sense of modern demands. That these standards are wholly inadequate for measuring the educational worth of types of industrial work is no longer debated; that scientific standards for evaluating the various types of industrial activities must be developed before educational content, or the lack of it, can be determined is obvious. Detailed occupational analyses must form an essential part of this work.

Willingness to operate experimental courses for chocolate dippers, for bindery workers, and for tobacco strippers, and to go thru the tedious task of making detailed analyses of operations in which there seems—in the light of present methods of evaluating them—to be no educational content, is a much more socially-minded and scientific attitude to take toward the study of the vexed problem of training women for industrial work than sweeping condemnations based largely upon opinion.

Miss Bryner's article reflects, unconsciously perhaps, the fatalistic acceptance of schoolhouse education bounded by a definite period of years. It is neither feasible nor desirable to duplicate expensive industrial plants in the school. Nor is it possible to make, under school conditions, the quantity and the variety of commercial product necessary for industrial training. Education for industry will, in large measure, be carried on in the industrial plants after employment has begun. The courses will be given by teachers specially prepared for the types of work they are to teach. They will

form an additional group among the many groups of teachers already employed at public expense. Then, and not until then, will there be any measure of successful educational work in the great growing industries. When such courses of training for industrial workers have been established in every line of factory employment—in every factory, perhaps—workers will be prevented from entering blindly into work for which they are not fitted. Training upon entrance to an occupation will make it possible for many persons to enter types of employment now closed to them. Changing from one line of work to another will be an accepted part of the working and educational program of young people. The chances for getting into a line of work from which there is no hope of departure will be reduced to a minimum. The elimination of the tremendous chances which young people just entering wage-earning have to take under present industrial conditions will greatly increase the possibility of prolonged education both before and after entrance into wage-earning. The risk of child labor exploitation will be more effectively guarded against than is possible under a penalizing factory inspection system.

"The big task which vocational education has before it, in the next few years," says Miss Bryner, "is to work out a comprehensive plan for the training of young women who are to earn their living in that homogeneous group of industrial occupations, the sewing trades." It is unfortunate that this helpful suggestion should have been made to hinge upon such artificial limitations as "the needle and needle machinery." Characterizing the sewing trades as homogeneous is also misleading.

Studies of the garment making industries of New York, Cincinnati, and Minneapolis made by the writer, and considerable contact with these industries in New York, Worcester, Boston, and other cities during the last ten years fail to support the theory of homogeneity which the author considers the important factor in determining content. The trend is away from handicraft sewing toward machine sewing with a strong probability—as the increase of machine processes and machine-made product shows—that hand sewing will eventually be eliminated except as a mending process.

In the midst of the vicissitudes of the experimental stage of industrial education, the pioneers in this field have pinned their faith to the sewing trades because of their hold on the future as a dynamic and widening field of opportunity. That the power machine sewing industries typify the trend of productive work is unquestionably true. The development of a system of vocational training in this field will, without doubt, give a fair basis for meeting the problems that are sure to arise in dealing with other specialized machine industries. The pre-occupation with the sewing trades in investigations, surveys and conferences has been fully justified by the results which have led to the proposal for a comprehensive scheme of training workers for occupations in these industries.

The sewing trades school is a logical and workable problem, particularly for the large cities in which the garment trades are carried on. Moreover, it is an obvious task because the technique of these industries and the demands made upon workers employed in them are more fully understood than other types of industrial work in which women are employed.

So far as training under the direction of the school is concerned, the battle against social prejudice and educational skepticism for this group of industries has been won. One factor that has stood in the way of a school in which all phases of garment making and other allied sewing trades might be taught, is the sharp line that is drawn between the business and labor organizations of the various branches of the industry. This is not an insurmountable barrier, however. The need for a sewing trades school and possible plans for establishing such an institution have been discussed in conferences of educators, manufacturers, and workers in these industries on several occasions with a measure of progress.

A sewing trades school is not prevocational work for twelve-year-old children in the elementary school or the junior high school, tho some instruction leading to it may be given in these schools. It is a serious vocational preparation (given in part before entrance into wage-earning occupations in these industries and during intervals after employment has begun) for any one of a great many types of work classified under the head of the garment and allied sewing industries. It is at least a near-adult educational problem covering the period of years between attendance in the regular schools and the attainment of adult standing as a worker in the trade. These periodic training courses will provide for promotions within the industry now so limited in number and vaguely defined as to be practically non-existent, as well as for the change from one occupation to another. Housed in a modern building, well equipped with modern machinery, well supplied with expert trade teachers and provided with sufficient variety and quantity of work of a commercial character, such a school could do an educational chore comparable in a measure to the one already done in commercial and professional fields.

While setting about this important task, let us not forget that social justice demands as much study, as much experimentation, as much search for light in dealing with the training for other lines of industrial work as have been given to the sewing industries. The pioneer spirit among educators and social workers was never more urgently needed in social educational work than in that phase which deals with workers in the mechanical industries about which we know so little.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

THE SCHOOLS AND THE WAR.

SCHOOL men of this country are now facing a situation entirely unprecedented in the experience of all of them. Our country is engaged in the most serious conflict of the world's history. The time is passed for discussion as to the wisdom for the step. The appalling situation is that we are at war with the German Government and that we will be called on to carry a large part of the burden of all the countries allied with us. While we all hope that it may not be so, at the same time the probabilities are that the war may be prolonged for months and perhaps years.

If this is to be, what shall the schools do in the situation? This is our own immediate problem as school men. Obviously the fact to be borne constantly in mind is this: Our country will have need for men in the future and we must not endanger the future of the country in meeting the present emergency. When the war is over we shall have an industrial and commercial war in which we must meet the same thoro, untiring efficiency of the European countries. Germany is already preparing for that situation and we must do likewise.

There should be no relaxation of effort to prepare the young people now in school for effective service. These young people must be prepared to meet the keenest competition of the world's history in industry and commerce. It will be sheer folly to cease our efforts for vocational education merely because the demands of the present are so great. The situation calls for redoubled efforts toward establishing vocational schools, evening classes, part-time schemes and all other means for supplying training for efficiency.

We are now realizing the terrific price which a country must pay for being unprepared for military conflict. Let us see to it that we do not pay a similar price for being unprepared for a commercial and industrial conflict.

FORMAL DISCIPLINE AND THE INDUSTRIAL ARTS.

No pedagogical subject has interested the psychologists more during the past ten years than formal discipline. The conclusions derived from extended experiments do not warrant the conclusion that any one subject of study or kind of subject has greater value than another in training the memory, reason, observation or other so-called general faculties of the mind.

The concensus of opinion among psychologists is that no such faculties of the mind exist as general faculties, but that memory, reason and observation are specific mental operations. There are many processes of memory, reason and observation, and drill in one process does not develop a general ability for all processes. In spite of this established fact our school authorities persist with school subjects that are taught with the avowed intention of developing general faculties of the mind. As a recent writer puts it, "It is as tho the doctors should ignore the germ theory in disease and continue to practice with antiquated methods." While this established denial of formal discipline does not warrant the conclusion that one subject is better or worse than another as a school subject, it does warrant the conclusion that school work should be made specific. It does warrant the conclusion that pupils should study subjects for which they have specific use and which arouses response in them thru individual application. It does warrant the conclusion that teachers should teach these subjects in the method of application so that the knowledge and training acquired by the pupil is applied to his activities in life.

The Industrial-Arts teacher may take some satisfaction in that his work is specific and applied. He may also take warning from the denial of formal discipline and avoid that formalization of his work which is based on the assumption that any study may be adapted to vague general results. Efforts toward general results lead inevitably toward general inefficiency. Some of our school work is too general to be efficient. Let us see to it that the Industrial Arts do not become so.

MARKETABLE PRODUCTS.

SO much emphasis has been placed upon the importance of having boys in the manual training shops make "useful things"—"marketable products"—that some people seem to think that all they need to do to ensure the excellence of their work is to have the boys make marketable things. In a city high school manual training department we recently saw the following: The first class of boys came into the machine shop in the morning and two boys were assigned to placing a lathe casting on the bed of the planer in order to plane its base. The boys levelled up the work and just got the casting firmly bolted to the planer bed when the bell rang and their class time closed. When the next class came in one boy was assigned the task of grinding a tool and continuing the job. Just about the time he had the scale planed off the casting his class period closed. A boy in the next class continued the job and the boy in the

fourth class made the finishing cut and unbolted the casting from the planer.

The following situation suggested itself as a parallel: A man came into a hotel dining-room one morning and ordered a breakfast. Just when he had finished the grape fruit, he was called out, and another man took his seat. This one ate the bacon and eggs, when he was called out. The third one ate the cereal and went his way. The fourth ate the toast and coffee. Obviously an excellent breakfast was served, but who in the world got it?

It takes more than the mere making of a useful product to make shopwork valuable to a boy.

A UNIQUE COMMENCEMENT.

ON the evening of April 21st, a very unusual meeting was held in Milwaukee under the auspices of the State Industrial Commission. Two hundred regularly indentured apprentices together with a number of employers, labor union officials, and professional men gathered together for a banquet, and to witness the presenting of *state certificates of journeymanship* to fifty young men who had completed their apprenticeship under the supervision of the State of Wisconsin. After an inspiring address by Dr. E. G. Cooley of Chicago the young men's names were anncunced, and each walked up and received his certificate just like high school boys, normal school students, and college graduates walk up and receive their diplomas.

A majority, if not all of this group of young men, had been compelled by economic necessity to leave school at or near the age of 14, but a wise provision of the state law made it possible for them to receive what may be in their cases the best type of education. At the close of their term of apprenticeship the state has presented them with certificates stating that they have served the regular term of training in the trade, have attended continuation school the required time, and are now entitled to all the rights and privileges of journeymanship. This certificate will be recognized everywhere in Wisconsin and perhaps in all other states. The giving of the certificates with some degree of ceremony recognizes the dignity of the skilled trade.

To our knowledge this is the first time that any state has issued certificates of journeymanship and the event seems to have great significance. It marks a distinct advance in vocational education which offers unlimited possibilities. Thru Mr. Stewart Schrimshaw, State Supervisor of Apprentices, the Industrial Commission of Wisconsin is rapidly standardizing journeymanship in all of the skilled trades. Mr. Schrimshaw has made great progress in bringing about an agreement among employers and employees as to what apprenticeship should consist of and in developing a spirit of co-operation which promises great achievements in the near future.

QUESTIONS AND ANSWERS.

SINCE June, 1914, the Magazine has received and answered nearly seven hundred questions, from its readers thru the Questions and Answers Department. Space has permitted the publication of only a small fraction of the replies and the consecutively numbered record has not included several thousand requests for information or help on tools and supplies for school shops.

While the great majority of problems presented by teachers has been of the practical kind, some few questions have been so elementary that we have have almost doubted the good faith of the correspondents. It has been apparent too that some teachers have not mastered the fine art of questioning—an art in which every successful teacher must be proficient. Some questions have lacked in essential details and others have been so general that a specific, helpful reply has been impossible. Finally, some questions have related to matters which have been personal in character so that the only possible advice has been to do as seems best in the circumstances.

In reviewing the work of the magazine since its establishment, the editors feel that the questions column has not been the least serviceable of the special departments. It has at least afforded an opportunity of demonstrating that the magazine intends to be of direct help to all its readers. The invitation to make free use of the questions column is genuine and hearty and is extended to every reader.

Those who adapt scientific discoveries to industrial use are as entitled to honor and reward as those who made the original discovery.—*Doctor Ormandy.*

EDUCATION AND PUBLIC TASTE.

As I conceive it, such taste should be a sort of current flowing thru all the veins of our citizenship; an attribute of the man in the street; born in him with his birth; fostered thruout his childhood, his adolescence and his maturity. Not a polite possession or thing applied such as I have tried to indicate just now; not a negative, passive acquirement, but a living force, causing in him acute liking and desire for things orderly, tidy, useful, economical, good and beautiful; hatred for, and active revolt against poverty, shiftlessness, wastefulness, disorder, lack of foresight, sham and ugliness. With such a taste generally existent, there would be no mountains we might not move; our preachings and appeals would be to ears trained and receptive; our visions disclosed to eyes clear sighted from looking square at facts. For that taste will be the product of knowledge; knowledge of what is and of what should be, of the relation of things and of their meanings, of the relation of the individual to the community.

I have dared to say it will be, for that is what I believe. I do so because the knowledge of which this public taste may be born is to be derived only from education, and I greatly mistake present tendencies if they do not point to new educational paths, paths of self-realization as against mechanical obedience; of the substitution of self-discipline for dogmatic drill; of "learning by doing." The road is a long one and it needs so much re-paving that against the dull conservatism clinging to so many deep old hindering ruts, the only effective forces must needs be revolutionary.—*C. Grant La Farge.*

THE LINCOLN CONVENTION OF THE WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION

Nebraska went "bone dry" on Saturday evening before the Western Drawing and Manual Training Association convened in Lincoln on the following Wednesday. To compensate for such a drought the weather man provided a perfect deluge of rain during almost our entire stay in Lincoln. The magnificent new high school building in which were held all the programs and exhibits of the meeting was only a mile and a half from the hotels. All this doesn't seem so exciting until another interesting detail is mentioned, namely, that we landed in Lincoln in the midst of a street car strike that made walking a necessity if not a pleasure.

Whoever deduces from the foregoing that a certain dampness was thrown over our enthusiasm and a chilliness about our welcome, is doomed to disappointment. These little eccentricities of law, of nature, and of men only added to the gaiety of things and heightened the color of our adventure in the "far west." And then, of course, there was the jitney.

The attendance was gratifying, but, of course, not large as compared with that of the three previous meetings. This was fully anticipated by those who are familiar with the work of the organization and who consider the location of Lincoln and the extremely unsettled conditions of the present time.

One thing in which this meeting marked a forward step was the matter of the exhibits. More than fifty schools and school systems from a very wide territory were represented. In point of size, variety, quality, and tasteful display, the exhibits at this meeting probably surpassed those of any previous meeting. The arrangement of the building for exhibition purposes was very admirable indeed. The large corridor on each floor extends entirely around the central auditorium. Along the corridors were arranged in most excellent taste the large and numerous commercial exhibits. Just off the corridors in the classrooms were the educational exhibits which ranged from the beginning work in the primary grades to the finished work of advanced college grade.

The sessions over which President Lake presided with quiet dignity and force provided a program that was full, varied, and strong. The annual banquet was delightfully original and unusually interesting. The numerous dining tables were decorated with tokens of the native American. As we went into the dining hall, we were furnished interesting caps with a number of large, gaudy feathers in each, which prepared us all for the realistic war whoops that went up from certain quarters of the hall presumably occupied by our genial and spirited commercial men. Certain other features of the banquet program deserve especial mention. The musical and dramatic performances by groups of Nebraska University students were exceedingly clever, and the banqueters showed their appreciation by repeated encores. Mr. Cornell, Director of Manual Training in Lincoln, is also Director of the University Orchestra that furnished much of the music of the evening. He deserves our thanks for this part of the program. All in all, it was an event of which the toastmistress, Miss Vandeline Henkel, may well feel proud.

PROF. IRA S. GRIFFITH
Columbia, Mo.
President-elect, Western Drawing and Manual Training Association.

Among the strong features of regular program should be mentioned some of unusual merit. Mr. Frank Alvah Parsons gave two timely and much appreciated addresses on "Art in Its Relation to Dress" and "The Value of a National Art Education." Miss Ruth Mary Weeks spoke on "Leading or Following in Vocational Education" and "What Shall We Do With Our Girls?" Miss Alice M. Loomis gave a most suggestive discussion of "The Influence of Home Economics upon Art Study in a New State." Mr. J. C. Wright gave an illustrated address on the very interesting work he is doing with the Productive Shop in Kansas City. Mr. H. W. Kavel of Dunwoody Institute talked on "Vocational Education and Federal Aid Under the Smith-Hughes Act." Mr. Andrews of Yonkers, N. Y., took the place of Mr. Royal Bailey Farnum. These are but a part of the good things furnished by the program committee.

The Lincoln people gave us a hearty welcome thru their Mayor, Hon. Chas. W. Bryan. They also showed us that they meant what he said by taking us over the beautiful city of Lincoln with its various schools, art galleries, and other places of interest. Much credit for the success and pleasure of the meeting is due Miss Martha Pierce, Supervisor of Art in Lincoln. It requires the expenditure

of much time and energy to prepare to entertain such an organization for four days. Thanks are due also to Mr. Miller, Supervisor of Music in Lincoln, for the most interesting musical numbers furnished by the children of the Lincoln schools. Also, as things moved on, one could not help noticing the efficient, spectacled, van Dyked gentleman who seemed always quietly to be on hand to set things right in every emergency. So, we could not help admiring the kindly, genteel manner in which Mr. Cornell, Supervisor of Manual Training in Lincoln, made himself indispensable to our pleasure and comfort.

Two cities contested for the 1918 meeting, Dayton, Ohio, and St. Paul, Minn. The Association voted by a large majority to meet in St. Paul.

The officers chosen are as follows: President, Mr. Ira S. Griffith, University of Missouri; Vice-President, Miss Vandeline Henkel, St. Louis; Treasurer, Mr. L. W. Wahlstrom, Chicago; Member of the Council, Mr. E. J. Lake, University of Illinois.

S. J. Vaughn.

MISSISSIPPI MANUAL ARTS ASSOCIATION.

The Mississippi Manual Arts Association held its annual meeting in connection with the convention of the Mississippi State Teachers' Association at Columbus, Miss., May 4. The program included a discussion of the "Necessity of a Strong Manual Arts Association" by Mr. Charles E. Thomas; "A Report of Progress in the Manual Arts in Mississippi" by Mr. E. L. Watson; and an address on "Co-operative Education" by Mr. H. N. Seney.

Mr. M. D. Broadfoot discussed the "Necessity of an Organized Course of Study;" Mr. H. R. Varnado presented "A Method of Using Textbooks in the Manual Arts;" and Mr. M. M. Baxter discussed "The Manual Arts Work in the Agricultural High School." Mr. Sam E. Woods closed the program with an argument for "Manual Training in the Rural Schools," and a constructive program for its introduction.

The newly elected officers of the association are: President, Mr. Sam E. Woods, Poplarville; Vice-President, Mr. H. R. Varnado, Meridian; Secretary-Treasurer, Mr. M. D. Broadfoot, Poplarville.

ART AND THE FURNITURE MANUFACTURER.

"Every furniture salesman is a teacher of art," said Dr. James P. Haney, Director of Art in the New York High Schools, at a meeting of the Allied Furnishing Industries, held at the Hotel Astor, New York, April 17. "The furniture salesman," said Dr. Haney, "can assist his customer to choose wisely so that the object bought shall be in harmony with the furnishings of the buyer's home. If the salesman is a good teacher, he will lead the buyer to see the laws of taste that underlie good decoration. If he is a poor teacher, he will try to sell expensive objects whether they suit customers' needs or not. It rests with the merchant and manufacturer, therefore, to see that their salesmen understand responsibility in leading customers to choose wisely. The manufacturer in this country has not been the educational force that he should have been. The future is to see a comprehension

MR. E. E. MacNARY,
Springfield, Mass.
President-elect of the Eastern Arts Association.

of this fact on the part of manufacturers. It is their business to co-operate in a great educational movement for the better furnishing of American homes."

The meeting brought together all the prominent furniture manufacturers of the country. It was inaugurated by the Grand Rapids Association and promoted by the 40 papers which represent the professional press connected with the furnishing and decorating trades. Dr. Haney, speaking on "The Education of the Manufacturer and the People," said, in part: "The word art is to have a new meaning. Its industrial significance is playing a greater part in the life of the country. Its restriction to forms of fine art, to pictures and sculpture is seen to be a mistake. It is coming to be understood to be a term rightly to be applied to all forms of decoration and design as these appear in dress, in business and in the home.

"Last year, this country spent over one-half a billion dollars on furniture, carpets, wallpapers and other furnishings of the home. In every separate article, the cost of which went to swell this huge total, there entered questions of color and design. Every article was bought because the customer believed that a wise artistic choice was being made.

"The average American home has been ridiculed as being ugly and ill furnished but the last few years has seen a great change take place. The schools everywhere have turned their attention to the application of the laws of design in the decoration of the home. The public is choosing more wisely than it once did. It will choose more wisely still and manufacturers must aid to promote this choice. The responsibility for the education of the public must be felt by them.

"The teachers in the public schools must teach art as a practical thing. Its laws must be shown to apply to every-day surroundings. Women are the natural furnishers of the home. They are the purchasers and, if art is to be practically taught to girls, it must center around the home. Every woman should be taught to take the same interest in the decoration of her home that she takes in the choice of the gowns which she wears or the clothes in which she dresses her children. The appeal of teacher and manufacturer should, therefore, be to this great audience. Women should be shown that they are judged by their homes as by their dress and that in the home they have the best opportunity to afford them to display good taste.

"Manufacturers in this campaign must not act singly and selfishly. It should be a joint campaign, a co-operative movement on the part of all makers of home furnishings. Co-operative advertising will help and also co-operative training of salesmen. Much can be done by the institution in different cities of associations like the New York Art in Trades Club. This society has done much to raise the knowledge and standards of taste of its members. Thru societies like it, the public can be directly reached in lectures and exhibits.

EIGHTH ANNUAL CONVENTION OF THE EASTERN ARTS ASSOCIATION

During the last three days of that memorable week in which President Wilson delivered his world renowned speech to the special session of Congress, and in which Congress declared that a state of war existed between the United States and Germany, the members of the Eastern Arts Association held their eighth annual convention in Philadelphia. Despite the seriousness of the times between seven and eight hundred teachers gathered in the spacious halls of Drexel Institute for the meeting which was held on the fifth, sixth, and seventh of April. A general spirit of sobriety and tense expectancy pervaded the gathering. A free thinking people cannot pass thru two and one-half years of world war, with a growing nearness to their own entrance upon the battle line, without gathering some of the deep feeling which must temper their normal attitudes.

Remarks from members in attendance indicated that the meeting was highly successful. The thoughtful attitude of those present contributed largely to this success. While a few missed the special trips to places of interest, usually considered so essential to the enjoyment of such a convention, the majority seemed not to notice this and would have found little time to spend in sight-seeing anyway. The papers were too valuable, the luncheons were too interesting and the exhibits were too inviting to allow time out.

Two new features were inaugurated at this convention. In the first place instead of having two afternoons given up to section meetings a single day of both morning and afternoon was devoted to this. Thus it was possible to carry over a morning's discussion to the profit of all without the break of a night and day between. Much favorable comment upon this change in program making proved its value to the members. This arrangement also permitted a single full day of general sessions, four addresses in all, again most agreeably received by the teachers.

In the second place the exhibit, which was housed in the Institute where most of the meetings were held, was reduced in size, especially chosen by a committee to avoid duplication as far as possible, and included a special exhibit of the work of individual members. Some two dozen people displayed a few examples of their professional work which ranges from jewelry, hand-wrought metal, pottery, and modeling to bookplates, etchings, crayon and pencil drawings and oil paintings. The reduced size of the usual huge exhibitions permitted one to study without weariness and therefore meant more to both exhibitor and delegate.

It would be unwise to attempt any criticism or analysis of exhibits. Suffice to say that Philadelphia, Camden, and Newark displayed comprehensive and helpful grade and high school drawing and manual arts products. The Cleveland School of Art, the Skidmore School of Art of Saratoga, the Philadelphia School of Design for Women, and the Margaret Morrison School of Carnegie Institute exhibited strong work from advanced students in the fine and industrial arts. The faculty of the art department of Pittsburgh University, Prof. Arthur Dow, C. Valentine Kirby of Pittsburgh, Morris Greenburg of Brooklyn, and Prof. Charles F. Binns of Alfred, N. Y., were among those who contributed to the members' exhibit. The commercial exhibits, as always, were admirably displayed and well attended.

Registration at the headquarters, Hotel Walton, began early on Wednesday, the day before the convention. From that time until late Friday, new faces constantly made their appearance. The meeting opened on Thursday at 10 A. M., with between three and four hundred present.

The program was designed to provide full time to speakers and plenty of time for various noon luncheons. The opening session witnessed a hearty welcome by Dean Rolland of Drexel Institute. Then followed a very scholarly address on "The Domain of Art Education" by Dr. Thomas Balliet, Dean of the School of Pedagogy, New York University, and an enthusiastic talk on the "Art Significance of the California Expositions" by Prof. Arthur F. Payne of Bradley Polytechnic Institute, Peoria, Ill.

An arts association, we were told by Dr. Balliet, should not be limited to drawing, manual training, and household arts, but it should rightly include literature, poetry and music. There are many things in common and we might well bring teachers of music and literature into our meetings for a more complete discussion of the true arts. In speaking of teaching he deplored the too prevalent method of dissecting a work of art and formally analyzing its parts until the pupil not only became blinded to its beauty but actually hated it. These two points are worth considering. A most interesting program could be developed on principles common to the arts and on the teaching of the beautiful in the arts.

In spite of the fact that only two speakers were scheduled, Prof. Payne found it necessary to shorten his talk considerably. A choice number of slides clearly illustrated his points as he enthused his audience with the idea of a true American Art so adequately demonstrated by the Panama-Pacific International Exposition.

An important, tho brief feature of the morning's program, was a very constructive address by the president. For some years it had been the custom to dispense with such an address. This year it was felt that both the occasion and the office demanded plain statements and recommendations for the future welfare of the association. These statements were cordially received and at the final business meeting the recommendations were carried out wherever possible.

Thursday afternoon, Dr. Arthur D. Dean, Prof. of Education, Columbia University, and Dr. James P. Haney, Director of Art in the High Schools of New York City, gave valuable addresses. Dr. Dean spoke in a very serious vein on the conservation of art, industry and the home for purposes of preparedness. His plea was strongly presented for an individual campaign on "What can *I* do to contribute to the general good at this critical time." It stimulated all his hearers with the desire to discover a war value in their different fields.

Dr. Haney gave a practical demonstration on "Training in Appreciation" with a class of Philadelphia children. He illustrated the manner in which young people may be trained to appreciate painting, architecture and sculpture and sketched with great rapidity on large sheets of paper as he talked. The demonstration was an exceedingly difficult one to perform but was handled with little apparent effort and with great success. The children were heard to make delighted remarks which meant that the audience was as well pleased.

DR. JAMES P. HANEY
Speaker,
Eastern Arts Association.

FRED P. REAGLE
Secretary,
Eastern Arts Association.

On Thursday evening, in spite of a heavy rain, 193 people sat at the banquet tables and talked over the good old times.

Mr. Leslie W. Miller, Principal of the Pennsylvania School of Industrial Art, and Dr. George Wheeler, Associate Superintendent of Schools in Philadelphia, were the principal speakers following the banquet. Both dealt with serious subjects, the one dealing with "blind alleys" in art education, the other pleading for a real and vital "motive behind the work." In the absence of Sarah Louise Arnold, Dr. Dean, Dr. Balliet, and Dr. Haney were prevailed upon to speak a second time. They responded in a highly satisfactory manner.

Friday was given over entirely to section meetings. The three sections, the Fine Arts, the Manual Arts, and the Household Arts, gathered in different places and followed their different programs.

In the Fine Arts Section the principal topic of the morning was based upon the relative values of representation and design in the teaching of the arts. The discussion was interesting and prolonged and resulted in the decision that one complemented the other, both were equally needed in art teaching. The afternoon was devoted to papers on lettering and pencil drawing. The day's speakers included O. F. Egge, of the Pennsylvania Museum and School of Industrial Art; Helen C. Cleaves, of Boston; Walter S. Perry, Director of School of Applied Arts, Pratt Institute; C. Edward Newell, of Springfield; Hugo B. Froehlich, of Newark; Prof. Arthur W. Dow, Columbia University; Mr. Scott Leslie, of the University of Pittsburgh; and Ernest W. Watson, of Pratt Institute.

The morning in the Manual Arts Section was devoted to a paper on the Junior High School, by James F. Barker, President of Mechanics Institute, Rochester; ten-minute talks by several men on special problems they were carrying out and several committee reports on prevocational schools, vocational education, the junior high school, and manual training.

In the afternoon craft work applied to high schools, and sheet metal problems and industrial work in the first six grades were presented in papers given by Paul Medary of Philadelphia and Miss Sara Patrick of Teachers College, Columbia. While the first paper showed what the Central High School of Philadelphia was doing in forging and sheet metal work the second threw new light on advanced and practical problems of a correlated nature. Miss Ida Fairbrothers of Trenton, N. J., by way of discussing Miss Patrick's paper, showed concrete examples of two problems which she had worked out, one the making of paper, the other the making of rubber, which is an important industry of Trenton.

In the remaining section the morning was taken up by papers on the teaching of the household arts, with reference first to home economics, second to household management, third to design. In the afternoon, dressmaking, cookery, and color in housefurnishing were discussed. The speakers were Mary B. Van Arsdale of Teachers College, Columbia, Edith Baer of Drexel Institute, Julia C. Cremins of Wadleigh High School, New York, Lula R. Crawford, Dickinson High School, Jersey City, Ruth Atwater of Pratt Institute, and Charles H. Meeker of Teachers College, Columbia.

Saturday morning presented two speakers again; Prof. Albert E. McKinley of the University of Pennsylvania on "The Study of a City's Industries" and Henry Turner Bailey on "The Larger View of Nature Drawing."

Prof. McKinley, in a brief address, told of many interesting ways in which the Philadelphia Chamber of Commerce was studying the history and development of the industries of that city and was then printing this information in readable form for text pamphlets in the different grades of the schools.

Mr. Bailey, as usual, captured his audience with his spontaneous personality and clever sketches. His plea was for better and finer drawing from nature, thru this the study of her principles, and finally the study of the application of these principles in the great works of art.

Finally an exceedingly well attended business meeting ended a convention which was said to be one of the most interesting and well balanced in the history of the association.

This report is not complete without some mention of the numerous luncheons which were held at noon on both Thursday and Friday. No less than seven different groups met for reunions and after-dinner speaking. These included a "get-together" meeting of various craft and manual training clubs, a Massachusetts Normal Art School Alumni reunion, a Teachers College reunion, a Pratt reunion, a Drexel Institute Household Arts reunion, a reunion of the students of the New York University Summer Art School, and a Normal and College section meeting.

These luncheons gave all an opportunity to meet friends and schoolmates, they called forth most interesting talks and they served to keep all very enthusiastic and satisfied with the meetings in general. Undoubtedly these luncheons are an acknowledged feature of the Eastern Arts Association Conventions.

It was fitting that at the last session a word was spoken in memory of three men who have contributed richly to the field of the manual arts. This Spring has brought to us the loss of Mr. James Hall, formerly Director of Art at Springfield, Mass., and at the Ethical Culture School, New York; Mr. George Morris, Director of Art in Malden, Mass.; and Mr. Alexander Miller, Instructor in Drawing and the Crafts at the Brookline High School, Brookline, Mass.

For the ensuing year the officers are:

President—E. E. MacNary, Springfield, Mass.

Vice-President—Augustus F. Rose, Providence, R. I.

Treasurer— Almond H. Wentworth, New Haven, Conn.

Council—(The constitution was amended to include nine instead of six members). Three years: John C. Brodhead, Boston, Mass.; Mabel B. Soper, Bridgewater, Mass.; C. C. Heyl, Philadelphia. Two years: Frank E. Mathewson, Jersey City. One year: Amelia B. Sprague, Buffalo.

The next meeting will be held in New Haven, Conn.

—*Royal B. Farnum.*

PHILADELPHIA MEETING OF THE NATIONAL VOCATIONAL GUIDANCE ASSOCIATION

The annual meeting of the National Vocational Guidance Association was held at Philadelphia, April 3 and 4, in conjunction with the Employment Managers' Conference. War and local conditions kept down the attendance considerably, but an interesting program was carried out.

At the Tuesday evening meeting, held in the William Penn High School, delegates from different centers described their efforts in vocational guidance. Roy W. Kelly described the plan carried out in the Technical High School of Fall River; Benjamin C. Gruenberg gave an account of the trade extension courses in New York City; E. W. Weaver outlined the plan of the Brooklyn Vocational Guidance organization, speaking particularly of the possibilities of vocational guidance thru the church. Others on the program were: Miss Hilda Muhlhauser, who told of the vocational bureau work in Cleveland and of her work in organizing the women's and girls' division of the United States Department of Labor; I. B. Morgan of Kansas City, Kansas, who described guidance work thru continuation schools; Miss Viola Mannheim, who indicated the experience of the United Hebrew Charities of New York, in the work recently undertaken with young children; Miss Virginia MacMachin, who described the work done in the Henry Street Settlement and Public School 147, New York; and F. E. H. Jaeger of Newark, N. J., who showed the development of vocational planning and placement work in the East Side High School during the past three years.

In introducing the speakers, Supt. J. P. Garber pointed

out the special importance at this time of proper vocational adjustments, in order that the nation might be most effectively prepared, industrially as well as educationally. President Meyer Bloomfield replied to Superintendent Garber's welcome in behalf of the Association, and expressed the hope that the individuals and organizations in the vocational guidance movement might be able to be of specific service in allotting trained workers in case of war.

The Wednesday morning session was a joint session with the Industrial and Technical Conference of Philadelphia. Pres. Henry V. Gummere of the Conference introduced John C. Frazee, Associate Superintendent of Schools, as the presiding officer. The general topic of the meeting was vocational guidance and employment supervision, and a complete picture of the work done in fields relating to vocational guidance in representative types of Philadelphia schools, beginning with children of elementary school age and terminating with the university, was presented. The speakers were: Miss Elsa Ueland, Superintendent of Carson College; Henry J. Gideon, Chief of the Bureau of Compulsory Education; Dr. L. L. W. Wilson, Principal of the South Philadelphia High School for Girls; C. Alvin Snook, Principal of the Frankford High School; Frank B. Witherbee, Superintendent of Admissions and Discharge, Girard College; C. O. St. John of the Central Y. M. C. A.; Director James A. Pratt of the Williamson Free School; Prof. Edith Baer of Drexel Institute; Dean James H. Dunham, Temple University; and Dr. Arthur A. Jones of the University of Pennsylvania. It developed that a large amount of guidance, placement, and employment supervision work is done in Philadelphia, tho not usually under the name of vocational guidance.

More general topics were presented at the afternoon session. Associate Supt. Frazee, after depicting the variety of guidance problems in Philadelphia, introduced W. Carson Ryan, Jr., of the U. S. Bureau of Education at Washington, who reported on the recent progress in vocational guidance. Mr. Ryan pointed out the wide geographical distribution of vocational guidance work, the increased definiteness due to a rapidly developing literature, and the deepening influence of the movement on general education as indicated in the tendency to think in terms of life and vocation. Under significant tendencies in vocational guidance Mr. Meyer Bloomfield contrasted the early struggling days of the movement with the present interest, particularly as represented in the development of the Employment Managers' Conference. Dr. G. C. Bassett, of Pittsburgh, described some recent psychological experiments tending to indicate early vocational selection. Philip Davis, Director of the Civic Service House, Boston, described in his inimitable way, "City streets and how they guide children." Dr. John M. Brewer, of Harvard University, struck a new and interesting note in "The Life Career Class" as a point of departure in vocational guidance. Incidentally, he expressed a difference of opinion regarding types of psychological analysis that aroused a long, continued discussion. It had not been intended to hold an evening meeting, but the discussion that followed Dr. Brewer's paper was such that a round-table group of forty or fifty discussed current theories of placement and personal guidance until a late hour.

At the business meeting in the afternoon, the Association adopted the following resolution:

RESOLVED: That the National Vocational Guidance Association, composed of men and women concerned with the effective distribution of labor and service resources, offer to the Council of National Defense to co-operate in the development of plans for best assignment of work and training for young people.

—*W. Carson Ryan, Jr.*

The International Association of Teachers of Printing

The second annual convention of the Eastern Section of the International Association of Teachers of Printing was held on April 6th, at the Curtis Publishing Company and Hotel Bingham, Philadelphia. The meeting was more successful in attendance and accomplishments than the one held last year. Exhibits of pupils' work in printing from at least fifty schools lined the sides of the convention hall and showed the high-class work being done in schools thruout the eastern states. The gathering was distinctly one of printing teachers and the Curtis Company's auditorium proved an ideal place of meeting. Mr. R. A. Loomis presided.

During the sessions, a number of teachers spoke on different phases of printing work. Mr. John E. Mansfield, of Hawthorne, N. Y., read a paper on "Manual Training Course of Study." He expressed himself as convinced that printing as a manual training subject is just as important in the school as an established subject in its class and that it is capable of giving training in any of the common subjects.

Mr. Leslie L. Burnell, English High School, Lynn, Mass., who spoke on "Printing as a Manual Training Subject," brought out the fact that all-around work in the printshop brought into play many fundamental muscles and many more accessory muscles. In bodily growth the large muscles nearest the body develop first and then the smaller ones in the extremities follow. For proper development the motor cells controlling the fundamental muscles should be educated first and in growing order the cells controlling the smaller muscles. Printing requires eye accuracy and sensory ideas in combination and, therefore, may be purely educative. Its chief aim is cultural and no mechanical or trade subject has greater possibilities for cultural development.

Mr. Hugh V. MacDonald, Boardman Apprentice School, New Haven, Conn., told of the printing work in his school. The school operates 50 weeks a year, five and one-half days a week with the exception of legal holidays. The time is divided into two hours for academic work and six for work in the shop. Inasmuch as this is an unusually long school day and school year a large amount of printing is done which makes it possible for a large amount of instruction in printing being given. The boys get intensive training in printshop work supplemented by proper academic studies.

Mr. A. C. Krupar, Prevocational School, Richmond, Va., told of the work in his school. The pupils in this class represent two general classes. The boy who is naturally bright and ambitious but finds academic work alone dull and uninteresting, and the boy who is forced to leave school at the end of the junior high school period to go to work. The work given in this school may be either for cultural or vocational ends.

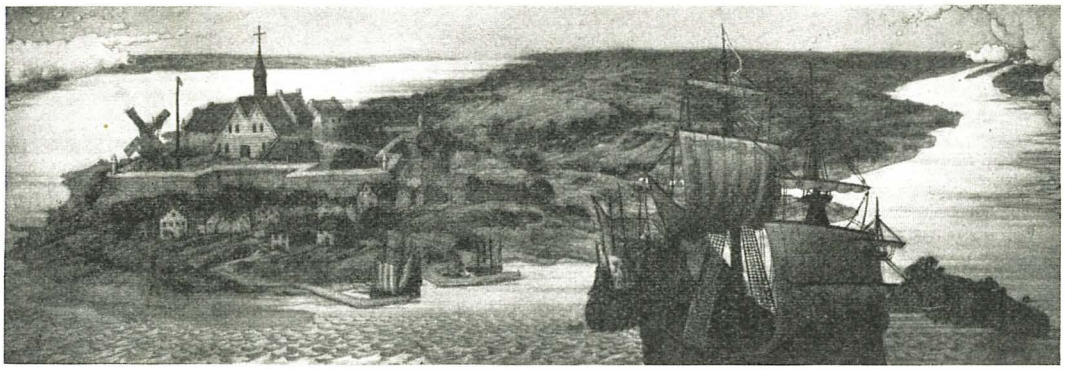
Mr. F. C. Lampe, Central School, Orange, N. J., read a paper on "Prevocational Course of Study for Printing." He outlined a course for printing instruction and stated that his idea of the proper teacher for this work was a shop trained man capable of teaching and developing the educational side of his work.

Mr. Arthur J. Godwin, School for the Deaf, Mt. Airy, Philadelphia, Pa., told of teaching printing to deaf boys. He stated that there were 134 such institutions in the United States which were at present giving instruction in printing to deaf boys. The work was begun at Mt. Airy, in 1887, and has proved very successful in making the boys self-supporting. The graduates in printing have no trouble in entering the trade and in becoming valuable workers.

Mr. C. W. Betts, Hampton Intistute, Hampton, Va., told of the trade work of many kinds in his institution. Negroes and Indians are taught with the idea that they will enter the trade and thoro instruction in all branches of the printing industry is given.

Mr. Arthur G. Brown, Indian School Carlisle, Pa., told how Indian boys are given a course in printing that will enable them to enter the trade as advanced apprentices.

Mr. Oscar Hamilton Hale, proofreader in the Curtis Company, gave an unusually interesting talk concerning proofreading and what should be taught in the public schools under the head of proofreading. He said they should be taught to spell, punctuate and divide words as well as set type.



THE EARLY SETTLEMENT OF MANHATTAN.
(Copyright, 1917, Salvatore Lascari.)
The new mural decorations in the Washington High School, New York, include three splendid historical panels depicting the earliest settlement of the Dutch on Manhattan Island. The paintings are by Salvatore Lascari, and have been secured thru the Municipal Art Society, in which Dr. James Parton Haney is a moving spirit.

They should know English and rhetoric and be able to write good compositions and give reasons for English constructions in them. His talk brought out very strongly the fact that printing may be a purely cultural subject as well as a trade subject.

Mr. James M. Harvey, of the Philadelphia Trades School, told of "The Apprentice and his Relation to the Trade School." He explained how the boy should attend the trade school on part-time basis and take advantage of instruction in this way. The apprentice should take advantage of every opportunity to develop along lines of his chosen profession.

Mr. Harry E. Milliken, Vocational School, Holyoke, Mass., gave his course of study which included an adequate academic training as well as shopwork in printing. He believed that the old shop apprentice system in which a boy was trained in printing by the "hit or miss" process is to be largely superseded by the school printshop course.

Mr. Glenn P. Robinson, State Trade School, Bridgeport, Conn., told of "Production Work in the Connecticut Trade Schools." The practice of production work in schools has been criticized very strongly by many interested persons. In Connecticut they have proved to their satisfaction that greater benefits are derived by doing regular jobs than in doing practice work. However, with all the doing of production work they do not lose sight of the fact that the boy is being taught and nothing is neglected that will help make him a good workman and a desirable citizen.

In the afternoon, the delegates were taken thru the manufacturing plant of the Curtis Company. This was an educative trip, as the printing machinery, methods and the company's apprentice school, were shown. A luncheon followed in the dining room of the Curtis Company, at which time the film, Thomas Jefferson Morgan, P-J-G, was shown.

In the evening, at the Hotel Bingham, a dinner was given. Mr. Frank E. Mathewson spoke on "The Teacher," and Mr. Henry Turner Bailey gave an illustrated lecture on "Training the Printer's Eye." Mr. Mathewson, who is head of the technical and industrial department of the Dickinson High School, Jersey City, N. J., told what qualifications a teacher of any shop subject should possess. He emphasized particularly, trade experience, education, teaching ability and personality. The good teacher of printing should know the history of his subject and all industries connected with it. He should not simply follow copy but should know when a thing is correct and when it is not.

Mr. Bailey gave a very instructive talk, illustrating good and bad specimens of printing. He explained by contrasting samples, how good color combinations may be secured and how good design and balance may be maintained in the arrangement of type. Mr. Bailey is of the opinion that American printing is just at the beginning of an era of perfection in the matters of design and color. The specialization of the work is bringing it to a high standard and the quality attained in the mechanical processes is making possible much more beautiful printing. Both talks were essential to the welfare of the printing teacher and were thoroly absorbed by the audience.

At the business meeting, the following officers were chosen for next year:

President, Mr. Elmer A. Throssell, Newark, N. J.; Vice-President, Mr. C. W. Betts, Hampton Institute, Hampton, Va.; Secretary, Mr. R. A. Loomis, Jersey City, N. J.; Treasurer, Mr. John E. Mansfield, Hawthorne, N. Y.

All in all, the convention was unusually successful in the meeting place, the attendance, the instructive papers, the dinners, and the inspection trips to the various places of interest in and around Philadelphia. A complete printed report will be distributed to all members of the association. Persons who are not members, may obtain a report of last year's meeting, or one of this year's convention, by addressing the secretary and remitting fifty cents.—*R. A. Loomis.*

A SCHOOL BUILT OF ORANGES.

A school exhibit of unusual interest was that held in San Bernardino, Cal., in February last, in connection with the National Orange Show. The exhibit took the form of a model school building, built of and surrounded with oranges. It was the work of the students at the San Bernardino High School and the pupils of the city grade schools working in co-operation.

The San Bernardino technical school building is the city's center for all manual arts work and all pupils in the upper grades of the city schools report once a week for instruction in manual training or domestic science. The exhibit, which was rectangular in shape, had for the center of attraction a model of the technical school. The general outline, which was worked out on a small scale, was an exact reproduction of the building as it appears. It was set on a base 12 by 14 feet, by 2½ feet high, surrounded by a lawn of sod and a low draped railing. Around the four sides of the base were banks of oranges and on the roof were similar banks of tangerines to represent the tile roof and turrets of the school.

The interior of the model was a reproduction of the classrooms, and the equipment gave a good idea of the character of work performed in the school. The rooms were lighted by

End Panels, the Early Settlement of Manhattan.
(Copyright, 1917, Salvatore Lascari.)

electricity and the gate posts were fitted with lanterns, the latter arranged to be turned on when the interior lights were not in operation.

The model for the building was begun early in the present school year by the boys of the grade classes. The entire work of measuring, drawing plans, finishing and wiring for electricity was done by the boys in the grade classes and the students of the technical school. About two hundred took part in the undertaking so that the completed project is truly representative of the schools as a whole.

The exhibit was planned by Mr. Burnett L. Lunt, instructor of manual arts in the Technical High School, and was executed with the assistance of the principal and director of manual training, Mr. C. F. Fraley. The exhibit drew the second prize of $50 and an award banner.

Arrangements have been made to refinish the building and provide it with a regular tile roof so that it may become a permanent exhibition for the Technical School.

A LESSON IN ARTISTIC HOUSE FURNISHING.

An object lesson in good taste and economy as applied to household furnishing was recently provided for the people of Milwaukee by the art classes of the six high schools. Under the supervision of Miss Emily Dorn, director of drawing, two booths were prepared and furnished at the Real Estate Show, held in April, at the Milwaukee Auditorium.

In outlining her plan to the teachers and members of the classes, Miss Dorn pointed to the fact that many families haven't the means to provide themselves with attractive furnishings which require considerable outlay, regardless of the fact that it is generally good economy to buy the better article. However, good taste and harmony are quite possible even when the greatest economy is required. To demonstrate this latter fact was the problem.

In furnishing the booths, Miss Dorn assigned to each of the teachers a definite portion of the work and caused them to locate and buy from second-hand stores a given number of articles at a price not to exceed a specified maximum. The pieces for the room shown in Fig. I, the inharmonious room—were similarly chosen and bought.

The room shown in Fig. II consists of articles of furniture which were originally no different in character from those shown in Fig. I. The individual pieces were repaired in the manual training shops and were then painted by the girls in the art classes. Grays, creams and tans are the prevailing colors thruout the room. The stenciled designs, which are in bright colors, were made by the girls and modified to fit each particular application. The drapes were dyed and stenciled by the girls; the pottery, the lamp shades, etc., were designed and made by students and the entire work was assembled by boys in the classes.

The list of the articles in room No. II is given below:

Windsor Chair	$0.65
Arm Chair	1.00
Stand	.85
Lamp and Shade	1.00
Overdrapes—13 yds. unbleached muslin at $0.08—dyed and stenciled	2.00
Window Frames with pictures painted of scene visible thru the windows at night	
Curtains—13 yds. cheesecloth at $0.05	.65
Table	4.25
Chest of Drawers	1.50
Wooden Chair	.25
Table Spread	.25

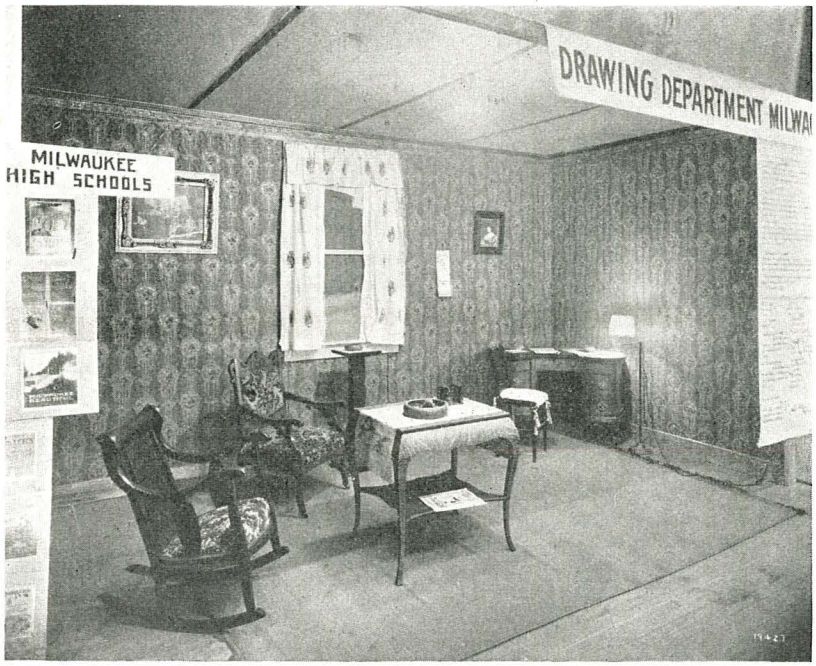


FIG. I. INARTISTIC ROOM.

Bowl—Indirect lighting (wooden chopping bowl) and chains	1.05
Desk—7 yrs. ago it cost	10.00
Rocker	1.50
Wooden Chair	.40
Linen for Cushions	2.80
Enamel Undercoat—White	2.70
Enamel—White	1.50
Tubes oil color	2.40
Colored Enamel	2.40
Incidentals	not estimated.

THE TEACHING OF VENEERING—A REPLY.

To the Editors:

In a few hasty, but evidently sincere word pictures, Mr. Cleaveland seeks to discourage the introduction into our schools of one of the most important phases of cabinet making. He states: "If the authors have had any experience with veneer, they know that the gluing of a piece of veneer to the core, or the making of a piece of built-up lumber is the most difficult work met in any gluing and it takes the most experienced hands and machinery to get good results."

It does not require machinery to teach the principles of veneering any more than it requires the use of a steam hammer to teach the principles of forging. Veneering machines—jointing, taping and others—are of recent origin, but the principle of veneering dates back to antiquity. The famous English designer, Sheraton, who relied almost entirely upon the use of matched veneers of various woods for beautiful effects, certainly did not depend upon machines.

Mr. Cleaveland also indulges in pessimistic prophecies about the future of our work. This, in view of the fact that he has never seen any of it, is most unkind. I very much doubt if he has seen any amount of veneered work at any other school, as very little of this work has thus far been attempted in the schools.

I fully agree that it requires teachers of special experience to *satisfactorily* teach this subject. Indeed, the first requirement for teaching any subject should be a thoro knowledge of the same.

"Teaching veneering with the aid of picture screens and not as something to be done in the shop" is suggested by Mr. Cleaveland. And while I believe the saying that "things seen are better than things heard," I am sure that things done leave the more lasting impression.

It would be fine to be able to back up our demonstrations and statements with the help of the "screen," but not having one, we will go on teaching veneering in our own humble way as one of the means to a good general education.

G. M. NYMAN,

April 23, 1917. Woodward High School, Cincinnati, O.

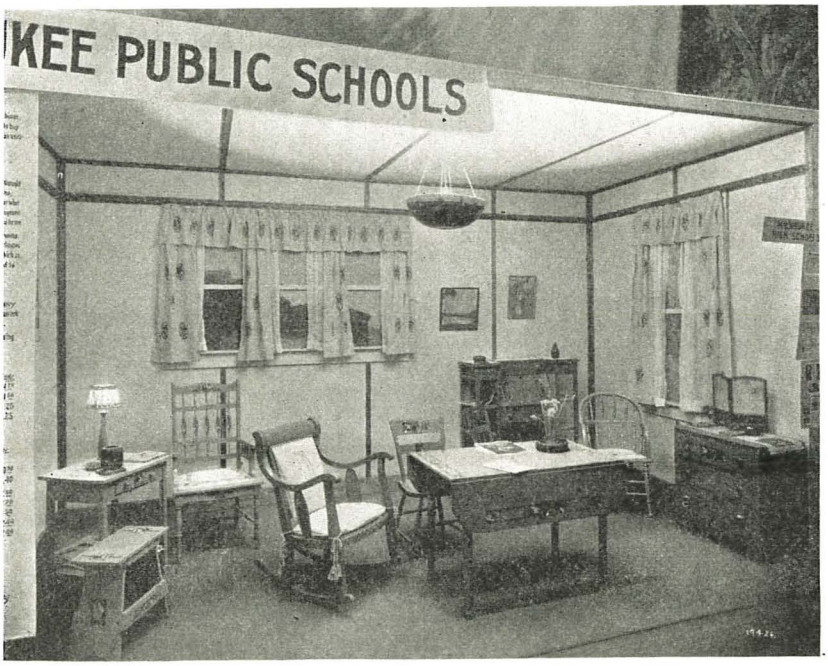


FIG. II. A HARMONIOUS ROOM.

VOCATIONAL ASSISTANCE IN THE HIGH SCHOOL.

Mr. E. W. Christy, who spoke recently before a conference of Cincinnati schoolmasters, discussed the topic: "The High School and Its Relation to Life." The subject, which had previously been considered by a sub-committee of teachers, was divided as follows:

1. Vocational life, including professional, commercial and industrial training.

2. Recreational life, both physical and mental, as applied to one's use of leisure time.

3. Social life, as applied to one's relations to fellowmen in community, state and nation.

Mr. Christy spoke of the opportunities of the modern high school in serving the present and future needs of boys and girls and showed how the schools must advance with civilization, industry and commerce. He pointed out that the high school of the present must include many more subjects in its curriculum if it is to maintain its vocational character. Among these subjects are commercial and industrial work, manual training, household arts, music and art.

Mr. Christy also spoke of the opportunity of the high school in reaching and holding the boys and girls who early drop out of the high school. In this work the school is not meeting the need of the student in a very large degree. The junior high school, which has been organized for this purpose, takes care of students who must soon leave school but who are in need of additional training.

In conclusion, Mr. Christy said:

"As we consider the work of both the senior high schools and the junior high schools, we cannot fail to recognize the effort to establish a direct relation with life by means of experiences taken from life, but a greater problem presents itself when we try to care for individual needs.

"If we could determine beforehand just who will go to college, thru high school, or remain only until 16 years of age, the problem would be simplified, but it does not seem probable that such a state of affairs will exist for many years to come. The high schools should continue to add to their activities in order to provide a multitude of wholesome experiences for those who come under their influence, for by experience alone do we acquire permanent knowledge."

Birdhouse Building Contest at Crookston, Minn.

The boys of the manual arts department of the Crookston, Minnesota, schools held a bird-house building contest and exhibition on April 12, 13, and 14 after preparation of about four weeks. Five hundred houses were entered, and over $50 in prizes were offered by local business men. Approximately 250 houses were sold, local organizations buying them for the benefit of the community, and individuals for themselves.

The local park board ordered three dozen specially built robin shelters for use in the several parks of the city and at present have "renters" for practically every "home."

Mr. O. F. Carpenter is the supervisor of industrial work at Crookston and Mr. Earl M. Schroeder is the assistant in charge of the Junior High School Manual Arts.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

A PROBLEM IN FURNITURE CONSTRUCTION.

Victor Randel, Teacher of Manual Training,
McCune Home, Kansas City, Mo.

At this time there is much beautifully designed and well constructed furniture on the market, yet there is a great variety of poorly designed and equally as poorly constructed furniture being offered to the public.

Whether or not a boy is to become a cabinet-maker or simply a citizen who will later need to buy furniture for his home, it is important that he know good furniture. In a school such as the McCune Parental Home for Boys one has a good opportunity to study with the boys some of the strong points as well as some of the weak points of different pieces of furniture. Among the buildings of the home there are a modern school building, and nine large cottages. An average of about 25 boys live in each cottage. Seven of the cottages are furnished with factory made furniture. Two cottages were built entirely by boys in the different vocational classes. All the furniture in these two cottages, except the iron beds, was built by the boys in the manual training and cabinet making classes. Besides building new furniture, it is a part of the work of the boys of these latter classes to repair the furniture of all the cottages. This is where the opportunity for studying the strong points and weak points of furniture comes. For example, when several chairs are sent to the shop for repair we begin at once to look for the cause of trouble. We find some chairs constructed from too light material; some have too few rails; some are weak in the back; some are weak in the joints; some have not been properly glued; and seldom do we find one that has been both glued and nailed. In many cases the design is not good. As teacher and students it is our present conclusion that a piece of furniture to be well designed and well constructed must adequately meet the needs for which it is intended. Figure 1 is a photograph of one of the eighty chairs that were built by the boys.

It can be seen from Fig. 2 that the making of this chair will require some careful work. The greater part of the work was done on the woodworking machines. The fact that the front posts are farther apart than the back posts, and that the lower end of the side posts are farther apart than they are at the seat of the chair, makes an interesting problem in cutting the tenons on the side rails. Since there were a great number of chairs to be made we thought it best to make some sort of jig in which to hold the rails while cutting the tenons on a machine. Not having a tenoning machine, we cut the tenons on the shaper. Fig. 2-M is a drawing of a jig that was used to aid in cutting the tenons. This jig is for cutting only the right-hand rails. One made just opposite to this was used for cutting the left-hand rails. In case a shop were not provided with a shaper, the same jigs could be used equally as well on a universal saw. By placing two dado saws of the same diameter on the mandrel with a collar between them the same thickness as the desired tenon, both sides of the tenon may be cut at the same time. The angle on the end of the jig at x is the same as the angle formed by the rail and the back post at x on the side view. The slope on the side of the jig at (c) is the same as that of the side rail at (a). Purposely the tenon is made wider than the mortise so as to provide some handwork for the smaller boys who were to assemble the chairs. It will be seen from the side view in Fig. 2,

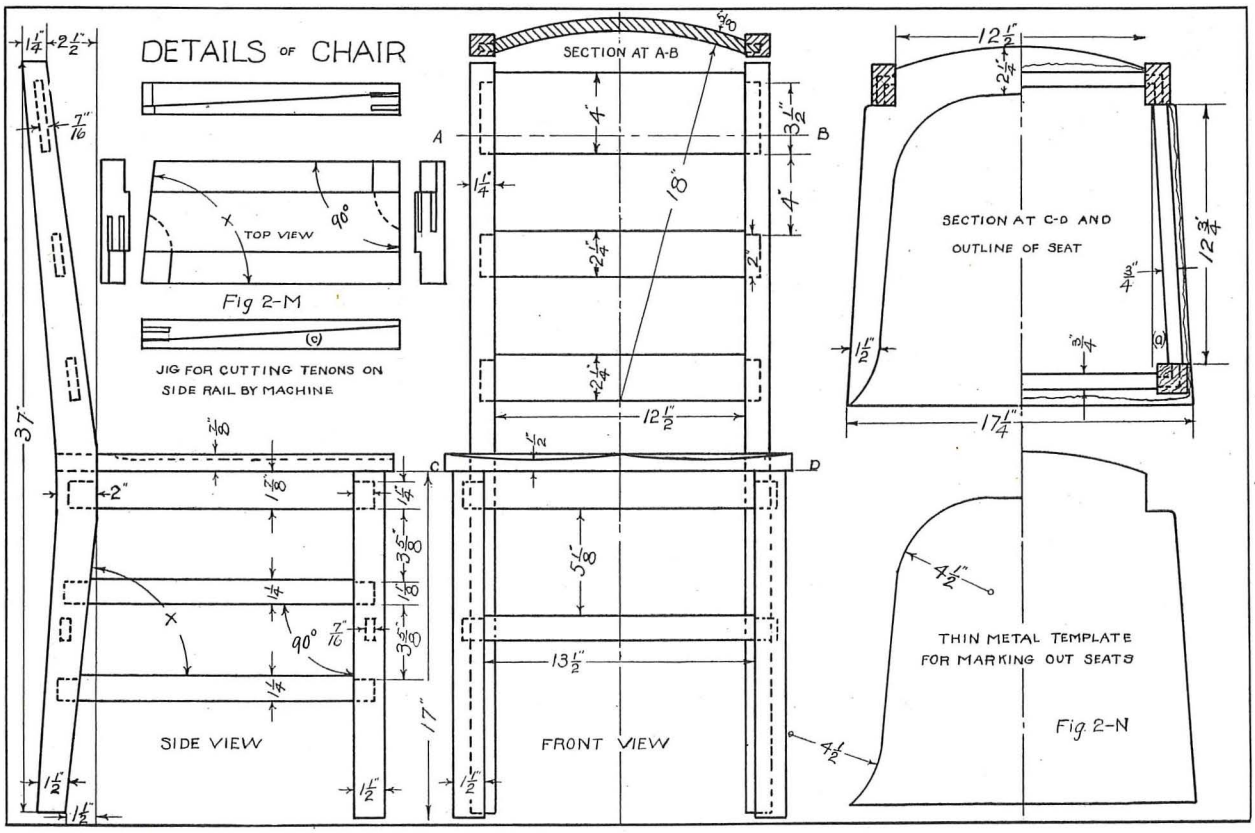


FIG. 2. DETAILS OF CHAIR DESIGNED BY MR. RANDEL.

Fig. 1.

that the part of the tenon to be trimmed off must be taken from the top edge, otherwise the rail will drop down and become too short. This problem of cutting tenons could have been made still more complicated had the back posts flared at the top instead of standing parallel as they are.

The curved backs are made up of three thin strips which are glued and clamped together in a curved caul. The tenons are cut on the shaper or on the universal saw in the same manner that the tenons are cut on the side rails. Of course there is a special jig used which holds the back in the proper position as it is pushed over the saw. These tenons are left full width of the back so they may be hand-fitted.

In making up the seats an opportunity was offered for doing both hand work and machine work. The larger boys got out the material, did the necessary machine work, and doweled and glued the pieces together. The dowels were placed nearer the lower surface of the boards so as to prevent being cut into later when the upper surface of the seat was being shaped. Before marking out the seats it was found advisable to make a template of thin metal as shown in Fig. 2-N. In using this template one simply lays it on the wood properly and marks around it. This will give one-half of the outline of the seat and one-half of the outline of that part to be gouged out and shaped. By turning the template over and placing its center line in its former position and marking around as before the entire outline will be finished.

After the parts of the chairs are assembled and glued, each mortise and tenon joint is nailed from the inside with from one to three small iron nails.

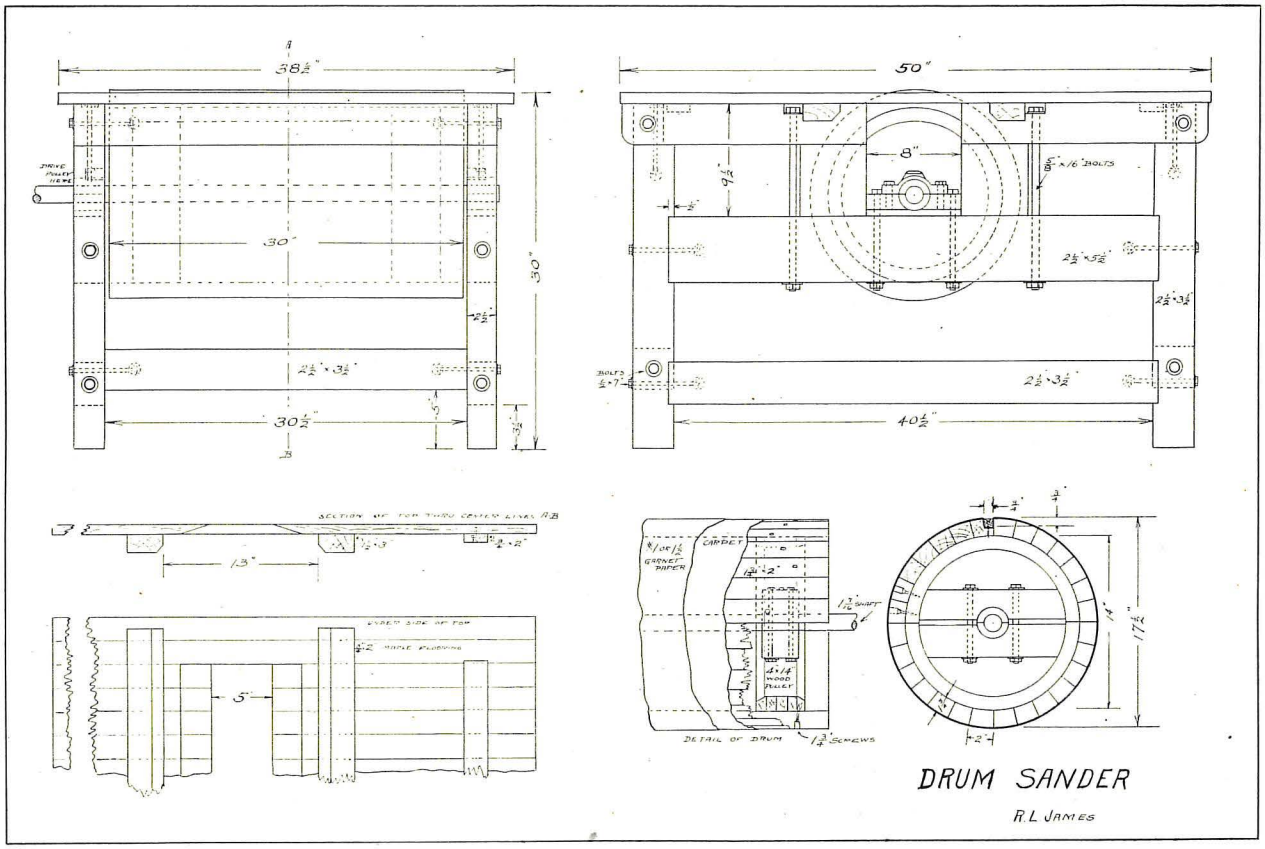
A DRUM SANDER.

R. L. James, Director of Manual Training,
Lindsay, Cal.

The Drum Sander, illustrated in the accompanying drawing, was made by the students of the Lindsay High School and has been found so useful that restrictions have been made in its use lest the boys receive no practice in hand sanding.

The framework of the machine is made of Oregon pine and is fastened together by $\frac{1}{2}$″ by 7″ machine bolts, as shown on the drawing.

The drum, the most difficult part, is built up on two 4″x14″ split wood pulleys which are fastened to a piece of 1 7-16″ shafting 42″ long, and running on two bearings which



DETAILS OF DRUM SANDER.

are bolted to the frame; the drum itself is made of enough pieces of 2″x2″x30″ long to cover the space required; these have the edges sawed to the correct angle so that when put together they will form a perfect joint, the holes are then bored in the ends of the pieces for the screws, the heads of which must be countersunk deep enough not to inferfere with the smoothing of the drum, which is done while it is revolving in the frame on its own bearings.

In smoothing the drum all high places are planed down to near the right circumference, then a 2″x3″ is nailed temporarily across the frame to rest the tool against while turning the surface smooth, which is done by taking a scraping cut with a turning chisel. Care must be taken to get the outside drum perfectly straight, when a straight edge is laid upon it.

After the drum is smooth, one of the pieces is taken off and a groove made ¾″ wide by 1″ deep to fasten the ends of the garnet paper securely. It is well to make this groove a little wider at the top so that when piece of maple, which holds the paper in place, is screwed in place it will draw it tightly.

A piece of carpet is tacked on the drum after the smoothing is done, and the edges are pressed down into the groove and tacked. Then the garnet paper is tacked temporarily on one end; a piece of wood is then held against the drum while it is revolved slowly by hand for one revolution so as to draw the paper up tightly on the drum. The ends are then pressed into the groove and the maple wedge screwed in place; this must be below the surface of the drum about ⅛″. If the ends of the paper are wet before putting on, it will not break when pressed into the groove. The ends must be left long enough to push down the side of the groove and along the bottom.

The top should be made of maple flooring held together with cleats as shown on the drawing, and the under side cut away to allow the drum to fit up into it properly. The top is held in place by screws.

The drum in the writer's shop is run from the motor on the band saw by simply changing the belt from one machine to the other. The most efficient speed for the sander is about five hundred to six hundred revolutions per minute.

BANDAGE WINDER FOR RED CROSS AID WORK.

J. C. Park, Oswego, N. Y.

The bandage winder shown here was designed and worked out by the class in sheet metal-working at the Oswego State Normal School for use about the school and by the local Red Cross Society. In the first order twenty-two were made by the students. The popularity of this winder is growing very fast and orders are in now for several dozen for use in nearby towns by other Red Cross chapters. The simplicity of construction and the processes involved make it a very suitable project for a seventh or eighth grade class in the tinshop. The amount of material used is slight. When in use the bandage winder is clamped to a table with a small carriage maker's clamp.

INDUSTRIAL ARTS ROUND TABLE.

The third monthly meeting of the Chicago Industrial Arts Round Table was held at the St. George Hotel in Chicago, April 13. This was the largest and best meeting that has been held by the club. After dinner the club adjourned to the conference room, where a free informal discussion was held of some current topics relating to industrial arts and vocational education. Considerable time was spent discussing the vocational education bill now before the Illinois legislature. Mr. Bauersfeld and Mr. Wahlstrom very ably led in this discussion.

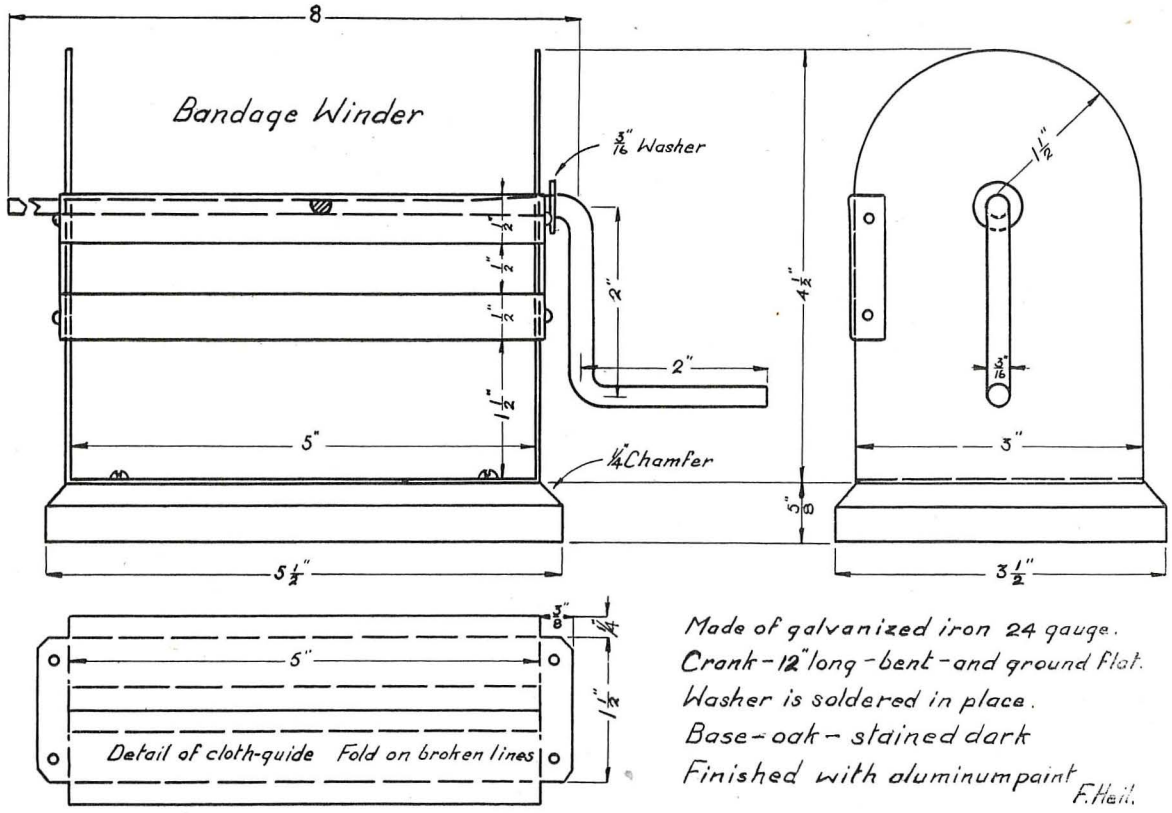
Mr. Filbey of Chicago University gave a very helpful talk on recent literature pertaining to industrial arts subjects.

The club plans to work in conjunction with other organizations on the important task of standardization of courses of study for industrial arts work in the public schools. Mr. Seipert of Bradley Institute was present and offered some valuable suggestions for this work.

Because of the free, informal way in which the club plans to conduct its meetings discussing the practical problems of its members, thus being mutually helpful to each other, the work becomes increasingly helpful and a splendid future is possible for its members.

Cities outside of Chicago represented at this meeting were Aurora, Waukegan, Joliet, Cicero, Highland Park, Hammond, East Chicago and Whiting.

Mr. L. W. Wahlstrom, of the Francis Parker School, Chicago, is president of the club.



NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Furniture Design and Jewelry.

581. Q.—Would you please send me a list of books on the following subjects: Drafting and making of furniture for beginners. Something for the beginner in jewelry design and etching.—*H. M.*

A.—*Haas's Art Metal Work and Jewelry*, $1, Sequoyah Publishing Co., Oswego, N. Y.; *Vaughn and Sorensen's Hand-Wrought Jewelry*, $1, Bruce Publishing Co., Milwaukee, Wis.; *Rathbone's Simple Jewellery*, $2, D. Van Nostrand Co., New York; *Rose's Jewelry Making and Designs*, Metal Crafts Publ. Co., Providence, R. I.; *Nye's Furniture Designing and Drafting*, $2, Wm. T. Comstock Co., New York; *Crawshaw's Furniture Design for Schools and Shops*, $1, Manual Arts Press, Peoria; *Crawshaw's Problems in Furniture Making*, $1, Manual Arts Press, Peoria; *Raeth's Home Furniture Making*, $0.60, Frederick J. Drake Co., Chicago; *Otter's Furniture for the Craftsman*, $1.50, David Williams Co., New York; *Griffith's Problems for Beginning Woodwork and Mechanical Drawing*, $0.75, Manual Arts Press, Peoria; *Griffith's Woodworking for Amateur Craftsmen*, $0.50, Manual Arts Press, Peoria.

Casting Plaster.

626. Q.—Please have the kindness to tell me the name of a firm where I can get a good grade of plaster-of-Paris for making casts and pottery molds?—*M. H. P.*

A.—One of the best plasters on the market is French's selected casting plaster made by Samuel H. French & Co., York Ave., Fourth and Callowhill Sts., Philadelphia, Pa. This plaster is made from Nova Scotia gypsum which is among the best obtainable.

Finishing Black Walnut.

630. Q.—Can you give me a satisfactory method of finishing black walnut, using boiled linseed oil and white shellac, obtaining finally a dull finish? Will these finishing materials bring out the richness of the walnut to a satisfactory degree?—*H. O. H.*

A.—Regarding the finishing of black walnut with linseed oil and white shellac, I might say that this is very uncertain in its results, chiefly because the differences of natural color in the heart and sapwood portions result from the different absorptions of the linseed oil by the wood. In order to overcome this trouble, I would suggest that a stain be made of the following material, which can be obtained from any drug store.

To one gallon of boiling water add one ounce of potassium permanganate and one ounce of Epsom salts. Sponge on this solution while hot, let dry and sand with 00 sandpaper.

It is a wise provision to brush on clear water, previous to staining, and let dry in order that the grain raised by the water may be sanded smooth, resulting in the opening of the pores and a much more uniform color thruout the project. From this point on the use of raw linseed oil instead of boiled linseed, as suggested by our correspondent, should be supplemented with one-half its volume of turpentine. After this has been allowed to dry at least three days, a second coat may be applied and allowed to dry as before. The work may be filled or not as desired. One or more coats of white shellac reduced one-half with alcohol should now be applied, allowing about three hours between coats, each of which should be sanded with 00 paper. Give a generous coating of black floor wax, letting this set for half an hour. By using a piece of clean brussels carpet and rubbing across the grain, finishing with the grain of the wood, a splendid polish can be produced. Another effect can be produced also by rubbing the work with a new preparation called "Stanvar" made by the Standard Varnish Company, of Cleveland, Ohio. This produces a remarkably good waxed effect and is devoid of all stickiness.

Where the work can be done in a satisfactory manner, my personal preference in finishing walnut calls for sponging the wood in clear water; staining as directed; one coat of oil and turpentine as directed; one coat of white shellac as directed; one coat of Van Dyke brown filler well rubbed in and cleaned off, letting dry 48 hours and sanding lightly; and three or more coats of varnish applied, allowing one week between coats, sanding the first two with 00 paper and rubbing the last to a perfect surface with No. F pumice stone, felt pad and water, cleaning up with an oil polish. Walnut when finished in this maner produces a beautiful brown and rich colored surface, very closely approximating the Grand Rapids furniture manufacturers' standard.—*RalphG. Waring.*

Red Cedar for Chests.

631. Q.—How can a person tell when he is securing good red cedar for making chests? Is there anything to the statement that there is a certain kind of red cedar that will not keep away moths?—*C. E. S.*

A.—The best, most aromatic, and time tried cedar for chests is the Eastern red cedar, known as Juniperus Virginiana. As there is not much left, and the trees are small, the wood used is usually full of knots, and where both the heartwood and sapwood is used the heartwood will be dark reddish in color, and the sapwood light colored. Western red cedar, which is also used for chests, because of the scarcity of the Eastern forests, is not as aromatic, and comes in clear, wide boards, very straight grained, and of fine, uniform texture. It is not supposed to be as effective against moths as the other kind, but as a matter of fact, if the eggs or larvae are in the germs they will develop in a cedar chest almost as well as anywhere else.—*E. A. Sterling.*

Book on Cane Weaving.

638. Q.—Will you please tell me how to cane chairs? —*T. J. S.*

A.—Seat Weaving by L. Day Perry (Manual Arts Press, Peoria, Ill.) is the standard work.

Finishing a Red Cedar Table.

644. Q.—Will you please give me information on how to finish a red cedar table, plain red cedar, as to stains and varnish if necessary?—*W. M. F.*

A.—The following formula for finishing Western red cedar or Thuja Plicata is very good. Western red cedar is quite different from the cedar of Tennessee and Kentucky which is known as Juniperus Virginiana, and for this reason individuals who have been making cedar chests must not use this formula for their class of material, which should be finished in the natural color only. To one quart of turpentine add one-half cup of raw linseed oil, two tablespoons of dark Japan drier and enough asphaltum varnish to produce whatever shade of brown is desired. If the color seems too dark, it can be readily reduced with gasoline, which is about one-fourth the price of turpentine. The color should not be judged, however, after trying on a sample of wood until it has been dried over night and given a coat of orange shellac reduced one-half with alcohol. If it is desired to carry this process to a good finish, this coat of shellac should be allowed to dry three hours and then sanded smooth with 00 paper after which one or more coats of Pratt & Lambert's No. 61 varnish should be applied at intervals of one week, rubbing the last coat with pumice stone, felt pad and water. Let the last rubbed coat dry one day and polish with the following mixture: To one quart of vinegar, add one-half pound rotten stone and one-half pint of either crude or "3 in 1." Apply this with a pad made of old billiard table felt or any dense, heavy cloth material. Be careful to polish only with the grain of the wood and not in circles as is erroneously advised in some books on finishing.

In regard to the finishes for gum, will say that the best way to handle this as a shop problem, is to use the stain as given for the cedar in a fairly dilute solution; one coat of orange shellac, reduced one-half with alcohol; sandpaper with 00 after drying three hours and give a second coat, which should be allowed to dry over night. Where time and small classes will permit, I believe in carrying this process further to the extent of several coats of varnish, which should be rubbed dull in the accepted finish for this particular wood. The most acceptable finish, however, for gum does not call for any staining, especially wherever there is the usual high figure and extremes of coloring. It should be finished in the dull unless it is a particularly choice piece of wood, when the rubbed coat should be allowed to dry over night and then polished with rotten stone and water, cleaning up with the crude oil polish and removing all traces of greasiness with a clean piece of cheese cloth.

For the basswood the same formula will give a very good brown and in case of mahogany tones, the addition of an oil soluble red or scarlet in small quantities at a time will ultimately produce whatever shade of brown or red mahogany is desired. The varnish finish should be carried from this point along the same lines as mentioned for gum.—*Ralph G. Waring.*

Books on Map Drawing.

645. Q.—Can you give me information as to where I can buy books on mapping, principally contour maps? —*H. G. L.*

A.—*Daniels' Topographical Drawing*, D. C. Heath & Co., Boston; *Smith and McMillan's Topographical Drawing*, price $2.25, John Wiley & Sons, New York; *Andre's Draughtsman's Handbook of Plan and Map Drawing*, Spon Bros., New York.

Books on Boats, Etc.

647. Q.—Will you kindly answer the following? Where can I procure books, drawings, etc., on model power boats and sail boats, model aeroplanes and zeppelins, kites, birdhouse construction and the construction of a Dutch windmill?

A.—*Power Boats—Verrill's The Book of the Motor Boat*, $1, D. Appleton & Co., New York; *Davis' How to Build a Launch*, $1.50, Munn & Co., New York; *Durand's Motor Boats*, $1.50, Munn & Co., New York; *Russell's Motor Boats*, $1, Munn & Co., New York; *Nine Motor Boats and How to Build Them*, $1, Munn & Co., New York.

Sail Boats—Elements of Yacht Design, $2, Rudder Publ. Co., New York; *Grosvenor's Model Boats and Yachts*, $1, Munn & Co., New York; *Verrill's The Book of the Sail Boat*, $1, D. Appleton & Co., New York; *Neison's Practical Boat Building*, $1, Munn & Co., New York; *Skene's Elements of Yacht Design*, $2, Munn & Co., New York.

Aeroplanes—Collins' Boys' Book of Aeroplanes, $1.20, Century Co., New York; *Cavanaugh's Model Aeroplanes and Motors*, $1, Moffat, Yard & Co., New York; *Hubbard & Turner's Boys' Book of Aeroplanes*, $1.75, Munn & Co., New York; *Hayward's Building an Aeroplane*, $1, Munn & Co., New York; *Hearne's Zeppelins and Super-Zeppelins*, John Lane Co., New York.

Kitecraft—Miller's Kitecraft and Kite Tournaments, $1, Manual Arts Press, Peoria; *Moore's Manual Training Toys for the Boy's Workshop*, Manual Arts Press, Peoria.

Birdhouses—Eckardt's Birdhouses, G. E. Stechert & Co., New York; *Bailey's The Birds and I*, College of Agriculture, Cornell University, Ithaca, N. Y.; *Hall's Handicraft for Handy Boys*, $2, Lothrop, Lee & Shepard, Boston; *Harper's Outdoor Book for Boys*, Harper Bros., New York; *Siepert's Birdhouses Which Boys Can Build*, Manual Arts Press, Peoria.

Windmills—Windmills and Wind Motors, Powell, published by Percival, Marshall & Co., London.

Lumber Market.

668. Q.—I would appreciate it very much if you could direct me to a market for black walnut lumber in considerable quantity, and the best method of disposing of same to best advantage.—*W. G. K.*

A.—The United States Forest Service at Washington, D. C., maintains a complete list of users of all kinds of wood produced in the United States, and is at all times glad to put manufacturers and owners of lumber in touch with possible markets.

Bubbles on Varnished Surfaces.

669. Q.—I have had considerable difficulty in doing varnishing in having blisters, or bubbles, form upon the surface a while after it is applied. I am doing the work in a dry, warm room free from dust and am using what is supposed to be a good grade of varnish. Please let me know what the trouble is and how it can be prevented.—*O. B. L.*

A.—The first consideration in answering this question would apply to the question of temperature of the room in which the varnishing is being done. If the room is warmer than 85° F., I have known varnish to bubble as this correspondent mentions. The best range of temperature for this work is 70°—75°, at which temperatures rubbing or polishing varnishes can be applied with perfect ease.

The second point considers the proper care of the varnish brush. This should be washed in clear turpentine and scraped dry with a pallette or putty knife. What little turpentine remains can be removed from the brush by swinging it away from the body in such a manner as to throw the slight amount of turpentine on the floor. This will leave the brush in perfect condition for taking up the proper amount of varnish. When the brush is not in use, it should be suspended in turpentine in a closed can, in such a manner that the bristles will be about one inch from the bottom of the can and that the turpentine will at all times cover the brush.

The last possibility, and one which is most likely to be the real cause of the trouble, lies in the varnish itself. A great many varnishes have the peculiarity of producing a gas which is absorbed while the varnish can is closed tightly. After opening the can and after the material is applied to the wood in a warm room, this gas subsequently expands, especially in work that has not been properly filled, with the result that a tiny pocket full of gas forms in each pore and after the varnish has leveled itself out, expands sufficiently to cause a small bubble or blister. For these reasons I never use varnish fresh from the can without first placing the material in a wide-mouthed jar, covering it with a piece of dried but thoroly washed cheese cloth and allowing it to stand in a warm room or in the direct sunlight for a day or longer before using. This often will produce an exceptionally fine brilliant gloss in such varnishes as wearing body stocks for carriage and automobile body work and is a method often resorted to by experienced finishers to bring about this extreme gloss on last-coat work.—*Ralph G. Waring.*

Filling Knot Holes.

The following method of filling in holes in the making of cedar chests is suggested by Mr. W. H. Schlagenhauf, teacher of manual training, Akron, Ohio, in response to question 657:

"I have found by experience that the holes caused by knots and other defects in cedar may be treated with sealing wax and that better results may be obtained by the use of this material than by the use of shellac.

"After trimmings, hinges, etc., have been fitted to the chest and removed, and the chest has been partly sanded, begin to fill the holes, cracks, etc., in the wood with hot sealing wax. This red wax can be bought in several shades and a very good match of any cedar can be made. The sticks are broken, placed in a small pan and heated over an alcohol stove. When in a melted state pour the wax into the holes of the wood until a little higher than level. Take a chisel and cut away the wax until level with the wood; then heat a putty knife and smooth over the wax until it is level and all air bubbles have been removed. After this, complete the sanding of the entire chest and proceed with the finishing. The result will be that the knot holes and cracks will be practically invisible."